Chemical Week

January 12, 1952

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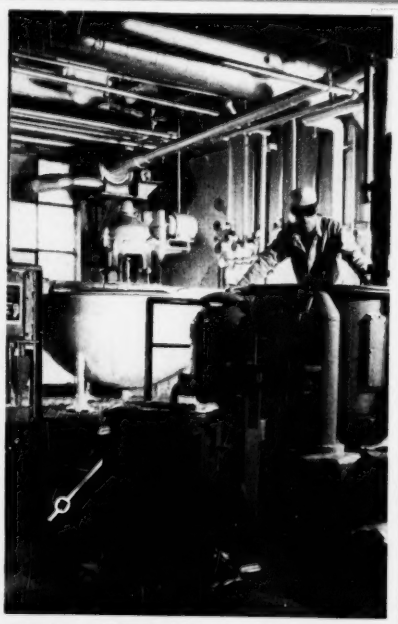

Sulfa drugs emerge from shadow of antibiotics; new uses, new forms spark uptrend . . . . . p. 11

Container eye appeal: That's the key to today's boom in aniline inks . . . . . p. 29

CW Camera sees behind-the-scenes safeguards governing drug development . . . . . p. 36

Look for sharper competition among polyols; reason: fatter output . . . . . p. 45

CW breaches Iron Curtain; gets Soviet benzene story from petrochemist Winkler . . . . p. 23

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Chemical Week

Volume 70 Number 2

January 12, 1952

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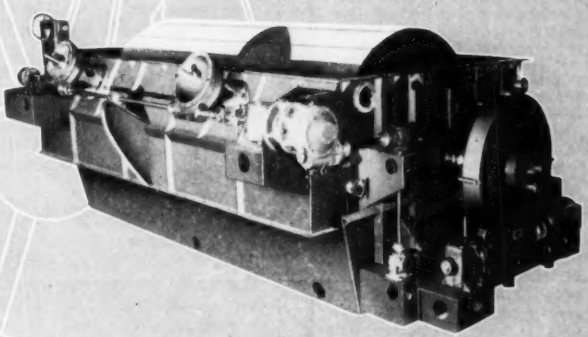

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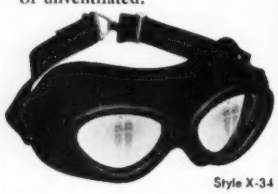

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OPINION . . . . .

Unique Two Ways

To The Editor: I am prompted to write you upon reading the article "Profitable Wonders" which appeared in your Oct. 27 edition.

In this article our trade-mark Chloromycetin is treated as a generic term.

Chloromycetin is unique in several ways. First of all it represents the only antibiotic drug which has been successfully synthesized upon a commercial basis. Secondly the term Chloromycetin is a coined arbitrary word registered in the United States Patent Office as a trade-mark.

I . . . bring this matter up solely to protect our rights to this arbitrary coined term.

Donald J. Grant
Parke, Davis & Co.
Detroit, Mich.

Keep an Eye on It

To The Editor: The use of the term "Patent Poser" as the heading . . . discussing the recently issued Gorin Patent (No. 2,570,543) in your Dec. 1 issue certainly appeals to the writer as being most appropriate. The potential importance that you assign to this patent, if it proves to be technically operable and economically sound, is most certainly not exaggerated.

In case anyone doubts this statement . . . I refer him to the paragraph entitled "Fuel Cells" in the textbook "Applied Electrochemistry" by A. J. Allmand and H. J. T. Ellingham. . . .

"One of the most important . . . technical problems is a better utilization of . . . available chemical energy of oxidation of fuel . . . many attempts have been made to convert it directly into electrical energy without the intermediate production of heat, i.e. to bring about the combination of the fuel and atmospheric oxygen *electrochemically*.

"If it were possible to do this, and reversibly, not merely a small fraction of the free energy of combustion of the fuel would become available as mechanical energy, but the whole of it . . . naturally would mean an industrial revolution only comparable with the first introduction of steam engines. Besides the enormous drop in the cost of power, resulting in a great extension of its use and in the unquestioned supremacy of coal as against water-power (this fact would be of particular economic importance to industrial electrochemistry), a successful fuel cell would mean a great mitigation of the smoke nuisance . . . vast changes in the engineering and chemical industries.

". . . All schemes so far proposed have been fruitless, but in view of the extreme importance of the subject we must consider it at some length here."

I think your explanation of the reticence of the assignee of this patent, the Pittsburgh Consolidation Coal Co. is in all probability correct. The comparatively brief period that this application was pending in the Patent Office, coupled with the fact that no pertinent references could be cited by the patent examiner, is in itself indicative that the application was allowed by the Patent Office on their first action on the case . . . an action rather unusual in Patent Office practice and very embarrassing to the patent attorney for the applicant.

The writer noted this patent immediately on its publication in the Gazette . . . being familiar with Prof. Allmand's quotation, as cited above, realized the enormous potentialities of this development, if successful, not only to power consuming industries in general, but especially to the electrochemical industry where cost of power may represent as much as 30% to 50% of the total manufacturing cost of a product.

We propose to follow the course of this development with diligence and interest . . . trust that your editorial staff will continue their efforts to obtain further information . . . will report such information in the columns of Chemical Week.

Frank S. Low
Patent Department
Westvaco Chemical Division
Food Machinery and Chemical Corp.
New York, N. Y.

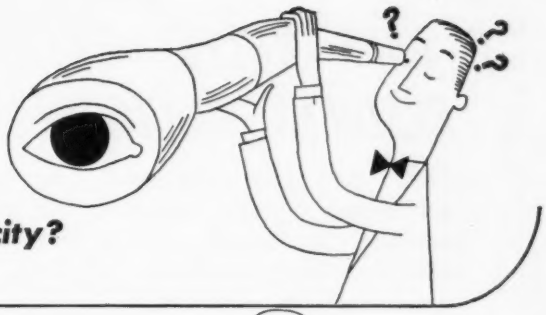
You may be sure, Reader Low, that CW will keep a close eye on this significant development in unlocking for use the energy lost in ordinary combustion.—Ed.

How Many Men?

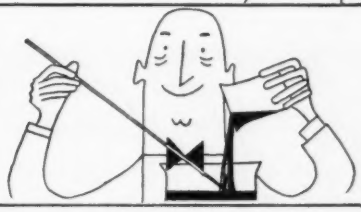
To The Editor: The copy of *Chemical Engineering* which I pulled from my mail box today has left me in somewhat of a quandary after reading your article on "How the New Napalm Process Works."

First, it seems that since the Sept. 22 issue of Chemical Week ("Napalm Goes Automatic"), the labor force requirements of the Ferro plant have gone up from 10—"Nine workers three to a shift, and a supervisor comprise the entire labor force required to operate the plant on a round-the-clock, seven days a week

Looking for a noncorrosive solvent with low toxicity?



Working with lubricant additives?



Examining catalysts for use in:

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3. *or the polymerization of certain monomers*

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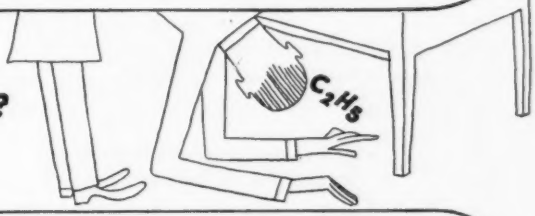
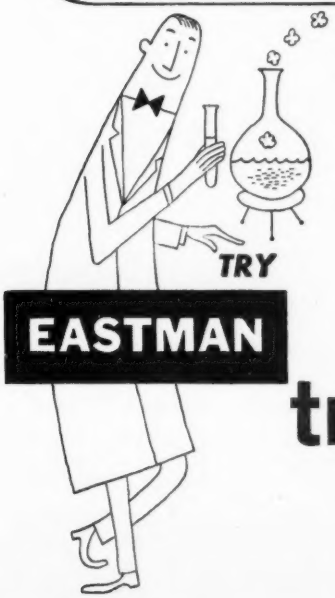


Thinking about manufacturing the new insecticide TEPP *(tetraethyl pyrophosphate)?*



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OPINION . . . . . .

basis"—to twelve—" a labor force of 12 (three to a shift and a supervisor)."

. . . We here in the Gulf Coast . . . have not found it is possible to operate a three per shift schedule on a round-the-clock basis with nine men without, of course, paying excessive overtime rates for men working every day of the week, month and year. If Ferro can do the job as outlined in CW please let us in on the secret.

Is my count off or can they actually run it with those numbers of employees?

J. C. Wright
Texas City, Texas

A keen eye and a sharp memory, Reader Wright. A nod, too, to our esteemed contemporary for a more precise phrasing in tagging the total labor force. Here it is: A crew of three and a supervisor per shift (as CW said perhaps a little ambiguously). That keeps the plant running round-the-clock. To avoid overtime charges another three workers plus supervisor are employed to meet seven-day operation schedules.—Ed.

It's All Settled

To The Editor: . . . Are you still actioneering with your controversial word "hassle" or "hassel"?

. . . At a neighborhood theater I happened to see the old film "Never a Dull Moment" . . . a marital spat between the hero and heroine was referred to as a hassle. The movie has a Western locale . . . maybe you can pounce on this as a source of the word. . .

Howard Donner
Winnipeg, Man.

To The Editor: This may settle the hassle: The most common meaning is now "wrangle," a heated and wordy argument. It is a word appearing in old dialect dictionaries in England meaning "to hack with a blunt instrument" . . .

Paul H. Avis,
Jourgensen Paint Mfg. Co.
Casper, Wyo.

CW's behassled editors are herewith completely disenhassled.—Ed.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.
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NEWSLETTER

The Department of Justice is asking for a lot more than it will probably get—but it's asking plenty from Federal Judge Sylvester Ryan in the Du Pont-ICI-Remington "cartel" case. It wants:

• Complete divestiture of the defendants' foreign holdings in jointly owned subsidiaries.

• Compulsory licensing of some 4,000 patents involved—royalty-free in the case of nylon patents.

• Compulsory issuance of manuals (to be revised annually for five years) completely describing the "know-how" required to use the patents; nylon manuals must be revised for eight years, and blueprints and other technical details must be furnished.

Judge Ryan heard the arguments and counter-arguments last week, but they'll undoubtedly require weeks of study before a final disposition of the case can be made.

Antitrust action, indeed, is the subject of one of the bills in the current Congress' legislative hopper. Chances are good that a uniform statute of limitations—6 years—will be passed. Freight absorption, too, will probably be legalized. It has already passed the Senate.

It's also likely that Congress will take up the stymied tideland oil situation. The present impasse prevents exploitation of direly needed underseas reserves.

While oratory drones on in the halls of Congress, the investigating committees will be having a field day in the little rooms.

• Office of Alien Property: Senator Wiley will probe deeply into the affairs of OAP-held chemical companies *(CW, Dec. 29, '51)*.

• Antitrust: Representative Celler will try to rescue "monopoly" from the limbo into which mobilization matters pushed it.

• Tax amortization: The Ways and Means committee may take a look at the fast write-off program, which politically potent unions describe *(CW, Dec. 22, '51)* as a "tax kickback . . . supported by phony reasons."

Water pollution is by no means a dead issue—not even sleeping. No legislative action is expected this year, but the U. S. Public Health Service is readying reports which will be the basis of action next year. Latest one—issued this week—is on the industrially important North Atlantic drainage basin (New York, New Jersey, Delaware, most of Pennsylvania and Maryland). This area accounts for 29½% of the nation's chemical plants, accounting for a third of chemical output.

The report calls for 683 additional waste treatment plants—many of them for chemical production installations.

If you don't think chemical output's going up, just ask the Association of American Railroads. In a year-end estimate of first-quarter carloadings, the Association predicts a 6½% rise over last year's first quarter for chemicals and explosives shipments; a 3% increase for fertilizers; a 1.3% rise for petroleum and petroleum products.

This is "Chemicals-in-Foods-and-Cosmetics Week in New York. Congressman Delaney and his committeemen started Thursday to hear 24 witnesses all on the cosmetics angle. From the roster of those appearing it looks as if the chemicals-in-foods facet won't be examined during the four-day New York sessions.

The last day (Jan. 15) of the Delaney hearings will run smack into audience competition with the Manufacturing Chemists' Association's one-day conference on the same subject. Highlight of the conference will be the unveiling of MCA's legislative proposals.

Heralded as a "positive approach," the recommendations are still being polished, checked with the other groups concerned with chemical additives so that the outlined legislation will have the broadest possible backing of various industry segments.

Washington reshuffle: Henry H. Fowler, Deputy NPA Administrator since last September, stepped up this week to top spot in NPA. Manly Fleischmann, who headed both NPA and DPA, will now give all his attention to DPA. Fowler, a lawyer, is a long-time (since 1934) agency man: RFC, TVA, and—during World War II—OPM and WPB.

Pricing of new products under CPR-22 has been a tough problem for chemical makers. Now OPS has come up with some clarifying changes:

• A manufacturer who has established a ceiling price under any other regulation may continue to use it after he files for CPR-22 ceilings until the new price is set. Section 34 is involved here.

• A seller who set a ceiling price under Section 7 of GCPR doesn't have to apply for a new ceiling under Section 34 of CPR-22. The two sections are almost identical, so OPS didn't see the point of using both.

"Mystifying and contradictory delays" are charged to Attorney General McGrath by Senator Wiley in OAP's handling of its Schering Corp. properties (CW, Dec. 29, '51).

McGrath countered that a prospectus is now being readied, should be in SEC's hands by the end of the month. That means that the stock may be offered for public sale in February.

"Big" chlorine is constantly getting bigger. Just last week two man-sized projects were revealed:

• Solvay Process Division will spend about $15 million for a mercury-cell plant near Moundsville, W. Va. Capacity figures out to well over 150 tons a day, and the cost represents about half of the planned investment for which Solvay has received a certificate of necessity. The new plant will be ready late next year, and meanwhile the firm's chlorine capacity at Syracuse, N.Y., Hopewell, Va., and Baton Rouge, La., is also being expanded.

• Hooker Electrochemical Co. just bought some land from the Tacoma (Wash.) Port Authority, is planning immediate construction of a $5 million chlorine-caustic plant.

The sulfur situation is sparking the third attempt within fifteen years to exploit sulfur-bearing ore deposits in Utah. Chemical Corp. of America is building a $300,000 pilot plant at Sulphurdale to process 100 tons per day of the ore, which is about 25% brimstone.

. . . The Editors

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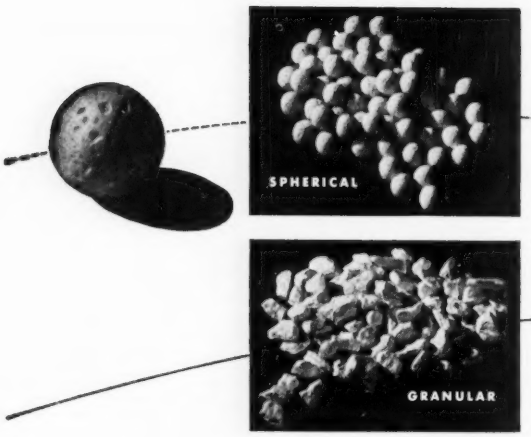

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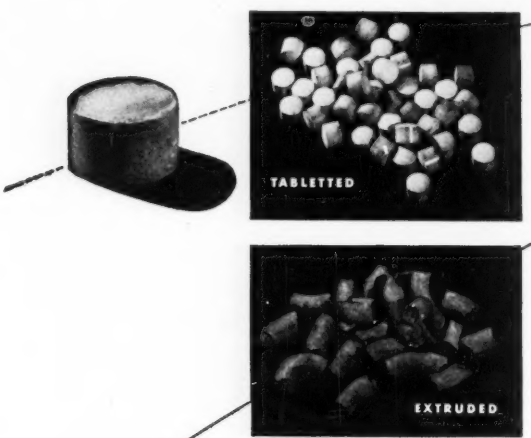

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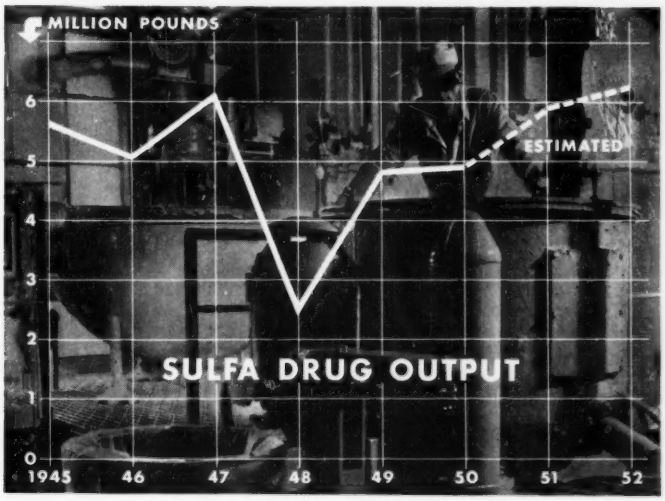


Sulfonamide Resurgence

Over six million pounds—that's the sulfa drug production picture for 1952, and the trend is up.

Markets are expanding: The potential in veterinarian medicine alone exceeds a million pounds annually.

And there are new drugs and drug combinations: Triple sulfonamides plus penicillin are the most recent; research continues to broaden the field.

When penicillin and streptomycin burst forth on the ethical drug market in large quantities, it looked as though sulfonamides were all washed up. Once the spectacular antibiotics got going, it was said, no one would bother to prescribe a sulfa drug; the sulfa drug industry was a gone goose.

But today sulfonamides are still big volume and big money: In 1950, almost five million lbs. were produced, sales were $21 million. Estimates for 1951 indicate a 20% increase over these figures and production hikes scheduled for 1952 should boost poundage well over the six million mark.

Production figures such as these may look puny compared with the 10 million pounds made by the industry in 1943, but at that time the Government was stockpiling drugs at a tremendous rate. Result: Government-dumped surplus after the war contributed to a $5 million drop in sales in 1947 and another $6 million slip in '48. Production in 1948 sagged to a 2½ million pound low (*see graph*).

Now the industry is back on its feet, and demand instead of lessening has increased. Here are the reasons why:

- Sulfonamides are cheaper than antibiotics: Refined production techniques have kept costs down, output up.
- Wider-range, less toxic drugs and drug combinations have been developed. Research continues to uncover new ones.
- A big new market—veterinarian medicine—is consuming close to a million pounds of sulfonamides annually.

Bargain Counter Items: There is no doubt that price is a potent factor in the continuing popularity of the sulfas as germ eradicators. For example, the recommended daily dosage of a sulfonamide such as sulfadiazine would cost 40-50¢ compared with $8-10 for an antibiotic like aureomycin.

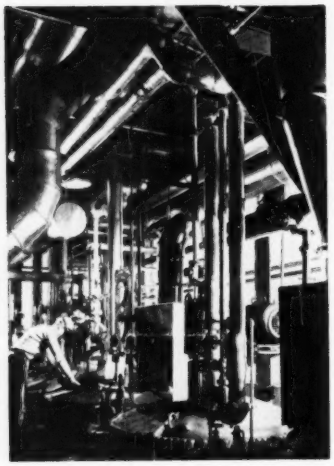
Price, however, isn't the whole story; performance is equally vital in building markets. And the sulfa industry has delivered top performance in two ways: (1) by synthesizing drugs of greater effectiveness; (2) by finding better ways to administer old drugs.

One of the more recent sulfonamides to reach the market is Hoffmann-La Roche's Gantrisin (3,4-dimethyl-5-sulfanilamido-isoxazol). According to clinical reports, Gantrisin is more soluble than many other broad-range sulfas (the patient need not be alkalized to prevent renal blockage*); is effective against an unusually wide variety of microorganisms; and is said to be remarkably free from toxic side effects and allergic reactions.

The discovery that the solubility of one sulfonamide does not interfere with the solubility of another when the two are combined, has led to a new way of marketing and administering the sulfonamides. Half doses of two such drugs as sulfadiazine and sulfamerazine together are as effective (perhaps more effective) than a full dose of either one used alone, yet the mixture is twice as soluble. Thus it can be absorbed more quickly by the body, and the danger of toxic side reactions is lessened. Warren-Teed's Bi-sulfazine, and Abbott Laboratories' Duozine are sulfa formulations of this type.

More recently, mixtures of three sulfonamides have found even greater favor. Lederle Laboratories has a triple mixture of sulfadiazine, sulfamethazine, and sulfamerazine as does Squibb (Terfonyl), Sharp & Dohme (Neotresamide), Abbott Laboratories (Truozine), and Eli Lilly (Neotrizine). Sharp & Dohme also has a sulfadiazine-sulfamerazine-sulfathiazole combination (Tresamide), and for the veterinarian trade, markets a mixture

* The relative insolubility of most of the wide-spectrum sulfonamides in acid solution can result in crystallization in the kidneys, subsequent renal blockage, perhaps death.



PRODUCTION: Lots of life in a "gone goose."

(Bovimide) containing sulfamethazine, sulfamerazine, and sulfathalidine (phthalylsulfathiazole).

Union with Penicillin: Latest twist in combining sulfanamides is their use with penicillin. Such a formulation provides the busy physician with a drug that not only has unusually wide applicability, but which is much less costly than penicillin or one of the newer broad-spectrum antibiotics alone.

Upjohn's Biosulfa, Squibb's Penfonylin, Smith, Kline & French's Eskacillin-sulfas, and Lilly's Neopenzine are examples of sulfadiazine, sulfamerazine, and sulfamethazine plus various strengths of penicillin. Schering Corp. has Penicombisul, a combination of sulfadiazine, sulfamerazine, and sulfa-acetamide with penicillin. Other marriages of the sulfa drugs with antibiotics are in the works, may soon pop up on druggists' shelves.

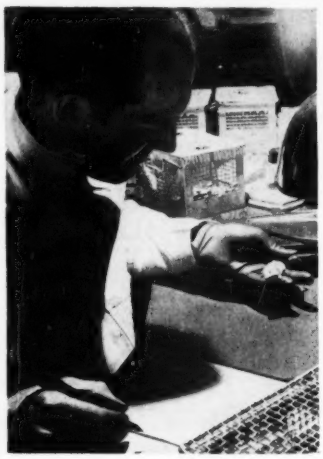
Sulfa combinations with and without penicillin are also available as sweet-flavored suspensions or candies formulated especially for children or old people unable to tolerate the usual tableted dosages.

Products with Character: The various double and triple mixtures, penicillin to augment therapy, and formulation of easily tolerated suspensions have done much to keep sulfa drugs before the eyes of the physician and the druggist. Pharmaceutical houses can now push a specialty and a trade name where previously they could offer just another brand of sulfonamide no different from any other brand on the market.

And there are a host of new sulfonamides manufactured on a relatively small scale for specific purposes. Winthrop-Stearns produces Sulfamylon (4 - aminomethylbenzenesulfonamide hydrochloride), markets it in combination with streptomycin sulfate solution especially for local infections. The company also makes Nisulfazole (paranitrosulfathiazole) for George A. Breon & Co. which distributes it as a 10% suspension to treat colitis.

Monsanto makes succinylsulfathiazole and phthalylsulfathiazole for Sharp & Dohme; the latter sells them as Sulfasuxidine and Sulfathalidine, respectively, for use in dysentery.*

Other special sulfonamides are Schuylkill Chemical Co.'s Sulfallantoin (*p*-aminobenzenesulfonamide glyoxyldureide), a sulfonamide plus cell proliferant; and Sharp & Dohme's Thalexyl, a combination of Sulfathalidine



RESEARCH: Wider-range, less toxic drugs.

and hexyl resorcinol for use as a urinary antiseptic. Sulfonamide preparations are also available for both nasal and ophthalmic therapy.

Favor on Farms: But perhaps the most promising large-scale market for the sulfonamides, and certainly the one accounting for a large share of production, is the veterinarian market. Here the price advantage sulfas enjoy over antibiotics is more important than it is in prescribing for humans; for only where a very valuable farm animal must be treated is an owner not likely to consider price.

And treatment of large animals for such afflictions as calf scours, foot rot, mastitis, etc. presents peculiar problems of its own. In most cases the animal cannot be hospitalized or watched carefully, cannot be dosed many times a day. What is required is a drug that can be administered by mouth or intramuscularly, one that will maintain suitable blood levels for at least 24 hours.

One of the more popular wide-range sulfas filling this bill is sulfamethazine (Lederle's Sulmet, for example), although sulfamerazine, sulfaguanidine, and other sulfonamides—used singly or in combination with each other or with penicillin or streptomycin—find favor in treating particular diseases in specific animals.

Poultry Preservers: The poultry industry, in particular, has been the scene of spectacular advances in animal sulfa therapy. Sulfaquinoxyline—introduced to the vet field by Merck in 1948—is being used as a low-level feed additive for the prevention of coccidiosis, scourge of poultry farms; sulfamethazine, for its treatment.

Since the introduction of the sulfonamides, incidence of coccidiosis in flocks has been cut from 10-20% to less than 2%. This has meant an estimated saving of 400 million pounds of meat annually in more—and healthier—birds raised. Also fewer egg-producing flocks have to be replaced, and less feed is wasted on fowl that never reach market.

Until recently Merck's sulfaquinoxyline has had the sulfonamide feed additive market pretty much to itself, but a newcomer—Dr. Salisbury's Laboratories' Nitrosal—promises stiff competition. Just going into production in the company's new $1 million plant at Charles City, Iowa, Nitrosal com-

MARKETS: Thousands of pounds down on the farm.

* Paul Lewis Laboratories, Inc. is licensed by Sharp & Dohme to make these drugs for export to tropical areas.

bines 30% N^4-acetyl-N^1-(4-nitrophenyl) sulfanilamide with 9% growth stimulator, 3-nitro-4-hydroxy phenylarsonic acid.

Since approximately 800 million broilers will be raised in 1952, perhaps a billion in 1953, poultry feed additives represent a potential domestic market for sulfa drugs of more than a million pounds annually, and the export field has scarcely been touched.

Eleven-Way Split: Dividing up sulfa markets today are 11 prime producers: Calco Division of American Cyanamid—by far the largest, accounting for more than half the world's supply—Merck, Winthrop-Stearns, Hoffmann-LaRoche, Monsanto, Paul Lewis Labs, Schering, Schuylkill Chemical, Eli Lilly, Squibb and, with the marketing of Nitrosal, Dr. Salisbury's Labs.

Calco is licensed by Sharp & Dohme (holder of the basic patents on the whole series of sulfapyrimidines as well as phthalylsulfathiozole and succinylsulfathiozole) to make sulfadiazine*, sulfamerazine, and sulfamethazine. It also produces benzoylsulfanilamide, sulfaguanidine, sulfanilamide, sulfapyridine, and sulfathiazole.

Merck concentrates on sulfaquinoxyline, but also makes sulfanilamide, sulfapyridine, and sulfathiazole and its sodium salt.

Monsanto manufactures sulfathiazole and sulfanilamide as well as producing succinylsulfathiazole and phthalylsulfathiazole for Sharp & Dohme.

Winthrop-Stearns makes sodium sulfathiazole, 4-amino-4'-(dimethylsulfamyl) benzenesulfonanilide, *p*-benzylaminobenzenesulfonamide, prontosil (soluble), and Sulfamylon; Schering Corp., sulfa-acetamide, and N^4-phthalylsulfa-acetamide (which Paul Lewis Laboratories is also licensed to make along with Sulfathalidine and Sulfasuxidine).

Eli Lilly and Squibb make sulfathiazole only, but Squibb is believed to be considering making other sulfa drugs for its own use in '52.

Nor is Squibb alone in its desire to move more deeply into the sulfonamide field. Not only are many other prime manufacturers—Calco among them—contemplating expansion of existing facilities, but potential newcomers are eyeing the burgeoning sulfonamide market too. They are finding plenty of life in the "gone goose" of a few years ago, and may, like Dr. Salisbury's Laboratories, decide to get in on a good thing.

* Calco owns a limited patent on sulfadiazine.

Campbell to Washington

NEW RIGHT HAND for Defense Mobilizer Charlie Wilson will be William L. Campbell, San Jose, Calif., Food Machinery and Chemical Corp. vice president. Campbell was sworn in last week as deputy DPA administrator and special assistant to Mobilizer Wilson.

Now It's the Law

NPA left a New Year's baby on the chemical industry's doorstep: the long-awaited orders restricting the use of sulfur and sulfuric acid. The new sulfur order amends the basic order, M-69, holds sulfur use by an individual company to 90% of that consumed in 1950. M-69 was issued on June 1, 1950, limited sulfur users to 100% of their 1950 consumption.

This cutback, according to NPA, eliminates the need for specific end use limitations on carbon bisulfide and sulfuric acid. A further effect is to provide small quantities of sulfur to make defense-slated sulfuric acid.

At the same time NPA issued a new sulfuric acid order, M-94, which took sulfuric out of the M-45 order under which limited allocation was maintained. In the new order each producer must offer for sale every month a percentage of his scheduled production of acid equal to that sold in 1950.

Inventory Limits: No supplier may deliver more than 20 tons of 100% sulfuric acid unless the purchaser provides a statement of its proposed use. Sulfuric will also be subject to the inventory restrictions of NPA Regulation No. 1, with the exception that a single shipment of no more than 60 tons may be received during any calendar quarter when the inventory does not exceed that permitted by Regulation No. 1.

The Government's sulfur conservation program continues limitation on certain uses of carbon disulfide and sulfuric acid. However, production of high-tenacity rayon is exempted.

Essential uses for the first quarter of 1952:

- Recovery of ammonia from coke oven gases for fertilizer production.
- Atomic Energy Commission uses.
- Manufacture of military explosives.
- Operation of petroleum refineries.
- Production of synthetic rubber and rubber products.
- Safety and health uses, e.g., manufacture of medicinals.
- Production of such pesticides as DDT.
- Production of metals.

Acid produced from elemental sulfur mined or recovered by the producer in facilities completed after June 24, 1950, is exempted. When other sulfur-bearing raw materials are used, this exemption is broadened to include any acid-making facilities whose operation started after June 24, 1950.

Specific end use limitations on carbon disulfide and sulfuric acid have been eliminated and replaced by the 90% limitation on sulfur. A further

effect of this cut is to provide small quantities of sulfur for shipment to specific locations for manufacture of sulfuric acid for defense needs.

Carryover Allowed: The carryover privilege of M-69 is continued. This allows a person who fails to use the permissive amount in any one month to increase his use to the extent of the unused amount during the succeeding five months. The 25-day inventory limitation put on sulfur by the Nov. 9 amendment to M-69 is continued.

For the orders to work, the necessary raw material must be available. But NPA and industry representatives are in dispute as to just how much sulfur will be produced this year. Industry says five million long tons. NPA says 5.2 million long tons. However, the tremendous variations in the productivity of the sulfur mines could well make both estimates overly optimistic—or the other way around.

Export Violations

A New York chemical company, A. E. Ratner Chemical Co., and a Canadian-Belgian firm, Continental Pharma, have been denied export privileges by the Department of Commerce's Office of International Trade as a result of alleged export law violations.

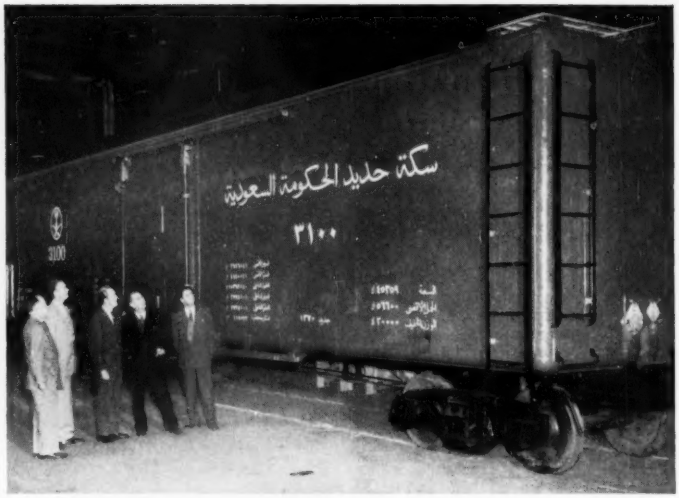
Specifically, the companies are charged with shipping aluminum oxide to Hungary—a violation of the present export laws. The ban will continue for the duration of U.S. export controls, but it won't take effect pending the outcome of the companies' appeals.

Eugene Hecht, owner of Continental Pharma of Montreal and half owner of Continental Pharma of Brussels, was also suspended from right of export. The case is the first brought against a Canadian exporter by OIT.

Hungary, Not Belgium: According to OIT, Hecht and the two Pharma concerns cooked up the scheme to obtain a large amount of the oxide for shipment to Belgium and transshipment to Hungary, which they knew was illegal. To induce Ratner to sell them the chemical, they at first represented to him that the final destination was Belgium.

After Ratner obtained the necessary U.S. export licenses, OIT says, and before any shipments were actually made, Hecht informed Ratner that the real purchaser was the Hungarian Heavy Industries Foreign Trade Co. Then, although both Hecht and Ratner knew that the licenses granted by OIT were good only for shipment to Belgium, they proceeded to complete the exportation. In New York Ratner denied knowledge of the Hungarian destination. "We were absolutely duped," he said.

The chemical, a strategic commodity usable in the manufacture of machinery for war purposes, was transshipped by Continental Pharma of Belgium to Hungary promptly on its arrival in Belgium.



Steel-Saving Freight Car

UNDER APPROVING LOOKS of company officials, the first of 65 all-plywood Unicel freight cars built by Pressed Steel Car Co. for the American-Arabian Oil Co. rolls off the production line. Constructed of cellular laminates, a relatively new material made by laminating strong plywoods grain-against-grain with specially-formulated plastics under heavy pressures to form a single unit-cellular structure, the cars use 20 tons less steel than the normal car. The harsh climatic conditions in Saudi Arabia are not expected to harm the new plastic-wood car.

Carbide Council

The Carbide and Carbon Council, an organization made up of leaders of the many Gas, Coke & Chemical locals representing workers employed in the plants of Union Carbide and Carbon Corp., recently took another step toward a master UCC contract.

Meeting at Niagara Falls, N.Y., the council scheduled for its next meeting, at Clarksburg, W.Va., the drafting of language for general use in contract negotiations with the company, and its many subsidiaries. Union officials view this as a major step towards the final goal of a company-wide contract.

Another major development at the meeting was the consideration of ways to secure the return of the electro-metallurgical plants of the company, now represented by the United Steelworkers (CIO), to their "proper jurisdiction" in the Gas, Coke & Chemical Workers.

In urging the appointment of labor members to the Atomic Energy Commission's labor relations panel, the council called on the CIO and the International Union for help and support.

Other issues involved unfair labor charges filed by Gas, Coke & Chemical against various plants of the company, and the studying of reports and analyses of fringe benefits in the various contracts of the company's subsidiaries.

LABOR . . . . . .

United Gas, Coke & Chemical Workers (CIO) have won another Minnesota Mining & Manufacturing Co. plant as the result of an NLRB election. Workers at the Little Rock, Ark., plant elected Gas, Coke & Chemical by a vote of 103-16. This is the fifth 3-M plant to be organized by Gas, Coke & Chemical.

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A new minimum schedule of salaries, approximately 14% higher than present rates, has been adopted by the Association of Professional Engineers of British Columbia. The Association

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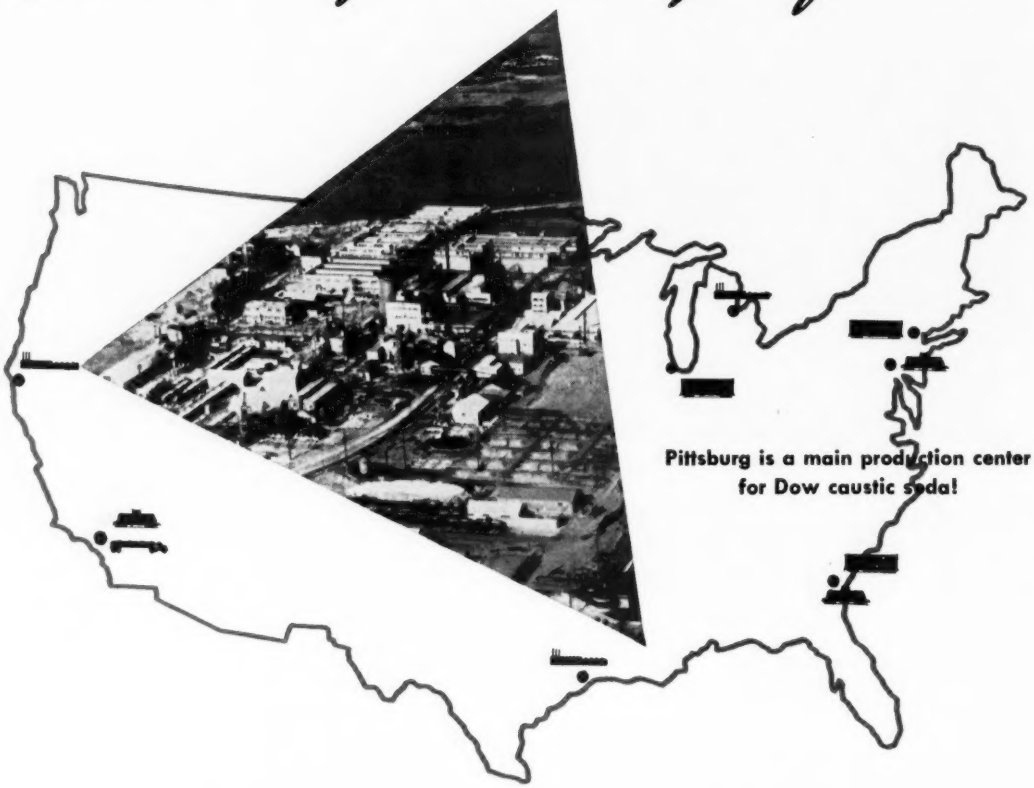

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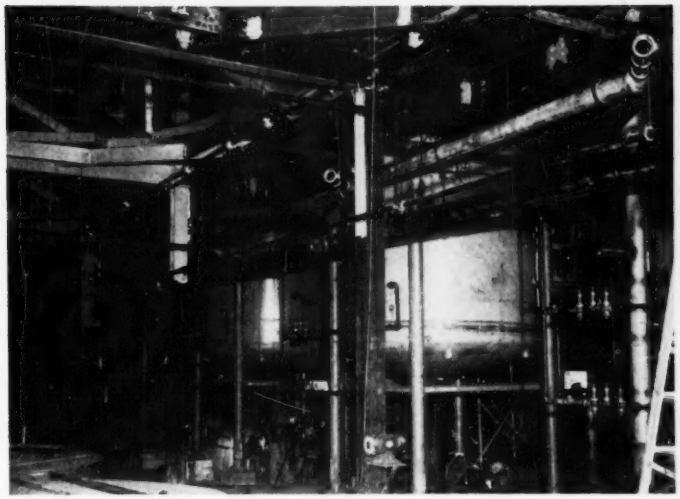


Progress on Acrilan

POLYMER BUILDING of The Chemstrand Corp.'s Decatur, Ala., plant was complete and equipment, such as process tanks shown here, was 30% installed at the turn of the year. The plant is expected to be in commercial production by spring, to reach initial rated capacity of 30 million lbs. of the new acrylic fiber, Acrilan, by year's end. Chemstrand will also make nylon filament yarn at a new 50 million-lbs.-per-year plant near Pensacola, Fla., has set 1953 as its on-stream target date.

has no power to fix salaries, but its recommendations are usually followed.

The new scale is: grade 1, $3,200; grade 2, $4,100; grade 3, $4,800; grade 4, $5,500; grade 5, $6,600; grade 6, $8,600; grade 7, $11,400; grade 8, $17,100.

•

Foregoing their strike threat, some 600 maintenance and production workers of Continental Rubber Works, Erie, Pa., voted to accept the company's offer of a 13¢-an-hour wage increase. The settlement, negotiated by officials of the United Rubber Workers (CIO) local, is subject to WSB approval; but since WSB approved the same hike for the rubber industry's "big four," no trouble is expected. The increase became effective Jan. 1, 1952.

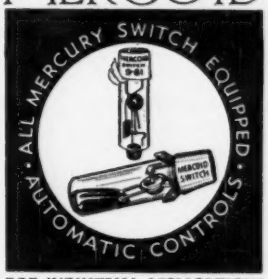
•

Recent developments in the New York cosmetic industry's labor relations include the organization for the first time of Warner-Hudnut. The new local is 585 of the CIO's Gas, Coke & Chemical Workers, and includes 700 members. The contract called for a 10¢-an-hour general wage increase retroactive to July 1; reduction of 18 months' progression range to 6 months' to obtain the top rate

Current List of DPA-Certified Chemical Facilities

COMPANY	LOCATION OF FACILITY	PRODUCT	AMOUNT ELIGIBLE	PERCENT
Monsanto Chemical Co.	Springfield, Mass.	Polyvinyl chloride resin	$1,190,000	50
Western Condensing Co.	Appleton, Wis.	Penicillin lactose	301,150	60
			54,450	40
Western Condensing Co.	Wausau, Wis.	Penicillin lactose	269,750	60
			18,250	40
Stauffer Chemical Co.	Hammond, Ind.	Sulfuric acid	117,435	70
National Petro-Chemicals Corp.	Tuscola, Ill.	Ethane, propane	7,700,000	65
			3,701,000	50
			2,304,725	40
			450,000	15
			149,000	65
Commercial Solvents Corp.	Sterlington, La.	Nitrogen solutions	1,326,100	50
Mathieson Chemical Corp.	Lake Charles, La.	Hydrazine	2,150,000	90
Monsanto Chemical Co.	Texas City, Tex.	Vinyl chloride	7,340,000	50
Kaiser Aluminum & Chem. Corp.	Moss Landing, Calif.	Magnesite for refractories	3,481,400	65
Kaiser Aluminum & Chem. Corp.	Salinas, Calif.	Magnesite for refractories	1,746,200	65

MERCOID



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. . . . . .

of pay; premium pay; sick-leave; job reclassifications; and $1 supper allowance when working one-half hour or more overtime.

In another case, a new contract was negotiated with Helena Rubenstein Inc., calling for a 12½¢ general wage increase, wage-reopening clause after six months, and additional wash-up time for special departments. This contract is still waiting for WSB approval.

EXPANSION. . . .

Silicones: Five million dollars is the tab that General Electric Co. will pick up in its latest silicone plant expansion at Waterford, N. Y. The new unit, to be erected by United Engineers and Constructors, is scheduled to operate by the end of the year.

Major reason for the plant expansion: the heavy defense demands for silicone rubbers. Anticipated: that these uses — water-repellent ignition systems, low temperature resistant gaskets and ducts (-100 F), communications and fire control cable, and hermetic seals for electronic components—will eventually develop in consumer goods.

•

Soda Ash: Construction of a new $20 million soda ash plant for Intermountain Chemical Co. (80% Food Machinery and 20% National Distillers) has begun near Green River, Wyo. An annual production of 300,000 tons of refined ash is expected by early 1953. The company hopes to triple the size of the plant at a later date. Intermountain has a certificate of necessity for $16.3 million of the plant's cost.

The soda ash in this unit will be prepared by refining trona, mineral sodium susquicarbonate, instead of the more conventional Solvay process.

Westvaco Chemical Div. of Food Machinery has been operating a mine and plant at this location for production of crude trona, dense natural soda ash, and light natural soda ash since 1947.

•

Titanium-Rich Slag: Quebec's Premier Duplessis told the Quebec legislature that the production facilities of Quebec Iron & Titanium Co. at Sorel, Que., for pig iron and high-titanium slag from ilmenite are to be doubled. At present one electric smelting furnace is in operation with four more in various stages of construction. The new expansion will provide a total of ten smelters.

•

Sulfuric Acid: Stauffer Chemical Co. plans to build a sulfuric acid plant

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SPECIFY RUBBER LINING FOR YOUR CORROSIVE FUME FANS—

It Will Multiply Their Life

"Buffalo" RUBBER-LINED EXHAUSTERS

For any fan installation that is to handle corrosive fumes, take adequate precautions ahead of time—specify rubber lining. You will save money, fan repair troubles and valuable steel. Ordinary steel fan housings and rotors are quickly destroyed by certain fumes, but rubber coating increases fan life three to twelve times. "Buffalo" Rubber-Lined Fans have rubber "welded" to all interior parts by the "Vulcalok" process. No metal parts are left exposed.

Naturally, efficiency, smooth rotor balance and proper performance characteristics also enter into the choice of a good fume fan. We welcome your inquiries into the entire "Buffalo" line of fans which have been proving themselves in the chemical industries for many years.

Right, showing how rubber lining protects all steel parts of the fan from fume corrosion.

Write For This Helpful Information On Fume Handling!

Bulletin 2424-E contains construction and performance information on "Buffalo" Rubber-Lined Exhausters and their application. Yours for the writing!

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FORCED DRAFT COOLING HEATING PRESSURE BLOWING

near Tuscola, Ill. First production is expected within 15-18 months.

•

Fatty Acids: Installation of a unit for manufacture of fatty acids by hydrogenation of glycerides has been completed by W. C. Hardesty of Canada, Ltd. Location: New Toronto, Ont.

COMPANIES . . .

Hooker Electrochemical Co.: A 20-acre site has been purchased by Hooker in the Port of Tacoma's industrial area at Tacoma, Wash. The new acreage will be added to the 30 acres that the company now uses.

•

Kingsford Chemical Co.: A charter of incorporation has been filed by Kingsford Chemical Co. with the corporation department of the Delaware Secretary of State. Capitalization: $20,000 and 12,000 shares of no-par common stock.

•

Foote Mineral Co.: Stockholders of Foote Mineral Co. will be asked to increase the authorized common stock from 300,000 shares to 500,000 shares at the annual meeting on Feb. 21. No definite plans are at hand for issuance of additional stock above the outstanding 259,422 shares. However, the company is considering various expansion plans and the board of directors seeks authorization now.

•

Brush Beryllium Co.: An $800,000 loan has been received from Reconstruction Finance Corp. by Brush Beryllium Co. The proceeds are for construction of buildings of a beryllium-copper alloy plant near Dowling, O. Equipment for the new unit is to come from the company's former plant at Lorain, O.

•

Byron-Jackson Co.: An additional 150,000 sq. ft. of manufacturing space will be provided for Byron-Jackson Co. at Lawrenceburg, Ind., to produce centrifugal and vertical turbine pumps. The plant was formerly owned by A. D. Cook Pump Co., which Byron-Jackson has acquired by an escrow agreement. The company plans to further expand the Lawrenceburg operations in the near future.

•

Thiokol Corp.: Defense Plant Administration has granted a loan of $400,000 to Thiokol Corp. for expansion of the company's specialty synthetic rubber manufacture at Trenton, N. J.

•

Basic Refractories, Inc.: Issuance of 10,000 shares of 5¾% cumulative preferred stock ($100 par) has been

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Oronite specializes in developing ways to efficiently and economically produce certain chemicals industry needs in quantity. Oronite products always adhere to rigid standards of uniformity, purity and dependability.

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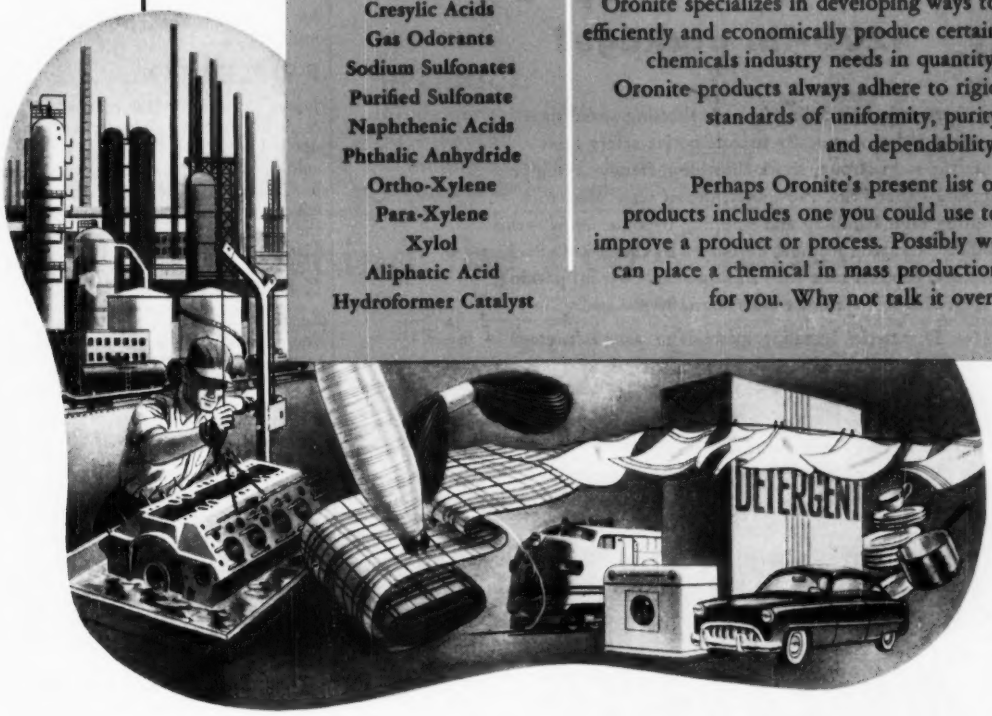

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approved by the stockholders of Basic Refractories, Inc. At the same time the authorized common stock was increased from 500,000 to 650,000 shares.

The 10,000 shares of preferred along with 35,000 shares of the common were sold to Investors Syndicate of America, Inc.; 74,475 shares of the newly created common were exchanged for the outstanding stock of Euclid Corp.; 30,000 shares of common were sold to H. P. Eells, Jr., president of Basic.

The new capital from these issues will finance a $3.5 million expansion program at the Maple Grove, O., plant.

•

Rayonier, Inc.: Arrangements have been completed by Rayonier for a long-term loan from Prudential Insurance Co. Existing loans of $10¼ million are to be paid off. The remainder will be used to finance future expansions.

Application has already been made for a rapid writeoff on a new pulp mill.

FOREIGN . . . .

Japan: A branch office of R. S. Aries & Associates (New York) has been opened in Tokyo. N. F. Alber, consultant to the Japanese government, has been named to head the office, and Teizo Shiohara, former head of the Japanese Drug Assoc., to assist him.

KEY CHANGES . .

Kenneth G. Donald: From vice president, Robert Heller and Associates, to vice president in charge of foreign operations, Celanese Corp.

G. W. Seymour: To vice president in charge of technical control, Celanese Corp.

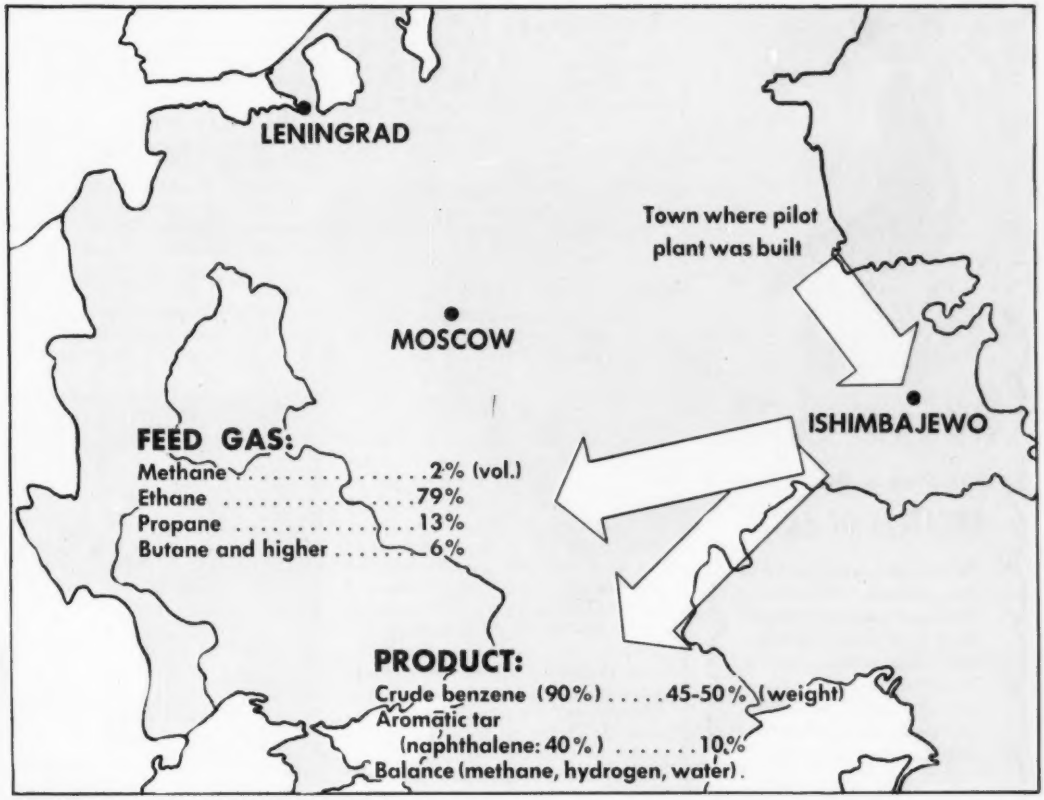
John D. Fennebresque: To vice president, Chemical Division, Celanese Corp.

Robert Wittenberg: From assistant-to-president and director, J. T. Baker Chemical Co., to manager, Chemical division, General Tire & Rubber Co., Akron.

G. R. Monkhouse: To vice president, western division, Shell Chemical Corp.

Arthur B. Hersberger: To manager, product sales division, Atlantic Refining Co.

Finley C. Nicholson: From manager, Cincinnati catalyst plant, to manager of operations, The Davison Chemical Corp.


LENINGRAD
Town where pilot plant was built
MOSCOW
ISHIMBAJEWO
FEED GAS:
Methane . . . . . 2% (vol.)
Ethane 79%
Propane 13%
Butane and higher 6%
PRODUCT:
Crude benzene (90%) . . . . . 45-50% (weight)
Aromatic tar
(naphthalene: 40%) 10%
Balance (methane, hydrogen, water).

Benzene Behind the Iron Curtain

Synthetic benzene may be commercial reality in Russia. Refugee chemist Joseph Winkler designed a unit.

He suggests synthetic benzene to solve our supply problem; for commercial feasibility he requires 1¢-per-lb. ethane.

His process involves two steps: Alkanes are first cracked to olefins, which are then converted to benzene.

Despite the tight seal on communications imposed by the Soviet Union, periodically someone manages to slip through and draw a picture for the rest of the world of political and economic life behind the Iron Curtain. Joseph Winkler, Polish petrochemist who is now a consultant in this country, is one of those who can give a first-hand account of life in Russia, since he spent several years there during World War II.

Winkler's story, however, is different from most of those that have already been told, for he brings news of some Soviet technological progress in the chemical field. On orders from the Commissariat of the Petroleum Industry, Winkler designed a pilot plant—in Ishambejewo, Ural—for making benzene from the ethane and propane of natural gas. And although he did not stay around for the construction of a commercial plant, Winkler reports that pilot-plant results were promising, thinks it a strong possibility that a full-scale synthetic benzene plant is now operating in Ishambejewo. He adds that other, similar plants may have been built throughout Russia.

Furthermore, Winkler suggests synthetic benzene as a partial solution to our own supply problems. For successful commercial synthesis, all he would require is either natural gas containing 10% ethane or an ethane concentrate that could be produced or purchased for 1¢ a lb. With penny-a-pound ethane and rapid amortization on a plant, Winkler figures that it would be possible to make benzene and sell it profitably for 40¢ a gallon.

Natural gas from the oil fields of Venezuela would qualify as feedstock for synthetic benzene, according to Winkler. He says that at the request of a South American industrialist he investigated the possibilities, found gas from the Officina Field—containing 78% methane, 10% ethane, 6% propane—that would be entirely suitable.

Alberta's natural gas might be another likely source of ethane for synthetic benzene; but Winkler cannot be sure since he has never been able to get a reliable analysis of the gas. As a practical limit, Winkler postulates a gas containing not more than 80% methane; the only certainty about Alberta gas is that it is "rich in methane."

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Flight from Poland: When the Russo-German war broke out (June 21, 1941), Winkler was in Drohobycz, East Poland. With the approach of the Germany army, he and his assistants were ordered to move to Ufa, Ural, site of the Commissariat of the Petroleum Industry, which had evacuated from Moscow.

On the 10th of August, Winkler arrived in Ufa for an assignment with the Petroleum Industry of the Second Baku region. There he was received by Deputy Kozlow (of the Petroleum Industry) who ordered him to start work as chief of the Petroleum Projecting Organization of the Second Baku in Sterlitimak, Ural.

Winkler's first job was to recover hydrogen sulfide and produce natural gasoline, propane and butane from natural gas obtained as a by-product of crude oil production in Ishambejewo (about 30 mi. south of Sterlitimak). Having a throughput of 20 million cu. ft. per day, the hydrogen sulfide unit was to be a duplicate of one that had been already installed in Berezneki, North Ural. Winkler and his assistant engineer, Tannenbaum, supervised the design of both the hydrogen sulfide and hydrocarbon units.

In December, the Petroleum Commissariat called Winkler away from Ishambejewo to a refinery in Wannowskaja for a year. On his return to Ishambejewo, he supervised the final installations and initial operations of the plants until the spring of 1943.

Benzene Synthesis: Winkler's next assignment was to look into the possibilities of making benzene at Ishambejewo from the residual gases which contained unusually large quantities of ethane. The work was carried out in conjunction with the Ishambejewo Branch of the All-Union Institute of Gas and Synthetic Fuel (WNIGI). Winkler was made assistant manager (to Branch Manager Karzew).

The project to make benzene from ethane and propane was based on Winkler's earlier research in the field.* He and his assistants worked on it from the spring of 1943 until December of the same year. During that time, they built a pilot plant and successfully tested a number of catalysts. As soon as the plant proved commercially feasible, the Russians decided to put up an industrial plant that would process about 5 million cu. ft. of gas containing ethane and propane.

Winkler was ordered back to Moscow when the WNIGI returned there in January, 1944; he left Moscow for Poland in July of that year. Before he departed, however, he heard that the designing phase for the commercial plant proceeded satisfactorily and that construction was scheduled to start in July, 1945.

Two Steps to Benzene: The ethane concentrate (2% methane, 79% ethane, 13% propane) used in the Ishambejewo pilot plant was passed through a specially designed "Duo Catalytic Cracking-Oxidation Unit" in which the feed was converted to benzene in two stages.

In the first stage, the predominant reaction was catalytic cracking of the alkanes to the corresponding olefins; in the second stage, oxygen-enriched air was added for the conversion to benzene and other cyclized aromatics (principally naphthalene, anthracene and some tar-like materials). The cracking temperature was about 810 C; the oxidation temperature, about 840 C.

JOSEPH WINKLER: Farm-bred petrochemist synthesizes benzene.

To avoid excessive tar production, quenching was necessary and was performed in an adjoining tower with the cool, recirculated, benzene-free gas. The quenched gas was cooled further, then passed through a tar remover where the aromatic tar was removed.

The gas was then sent through a conventional ethylene recovery unit; the residual gas was used partly for quenching, partly as a source of heat and power.

If a higher yield of benzene is desired, the ethylene can be recirculated and sent back through the catalytic oxidizer. This was done in one series of runs and the weight of crude

* Part of which was presented by Winkler at the Third Polish Petroleum Congress in Drohobycz in 1929, also published in *Petroleum Zeitschrift* in 1930.

SOAPS... DETERGENTS

a billion dollar industry relies on

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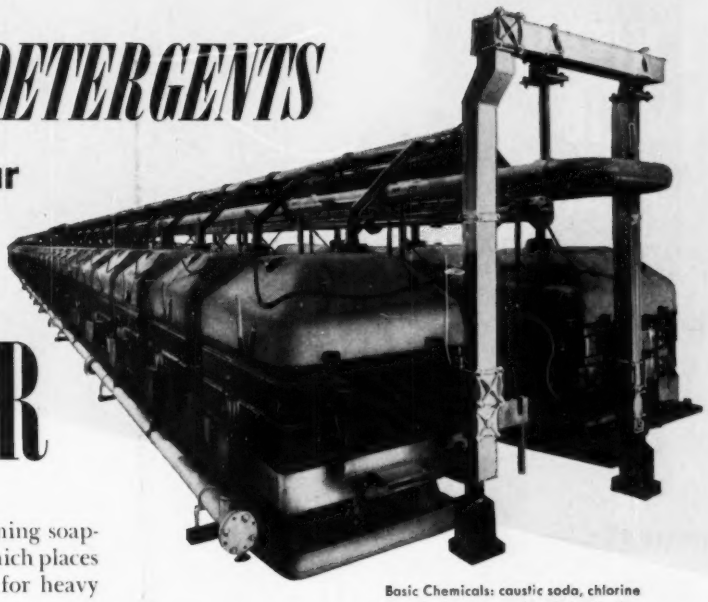

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CYCLOHEXANOL
METHYL CYCLOHEXANOL
MONOCHLOROACETIC ACID
MURIATIC ACID

DELIVERIES: Several of the Hooker Chemicals listed here are available now; some in limited quantities. Others will be available in the near future. Your Hooker sales representative will be glad to keep you posted on the current delivery situation.

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Sulphuric, Nitric and Phosphoric Acid Concentrators
Acid Sludge Recovery Plants

752

PRODUCTION . . . .

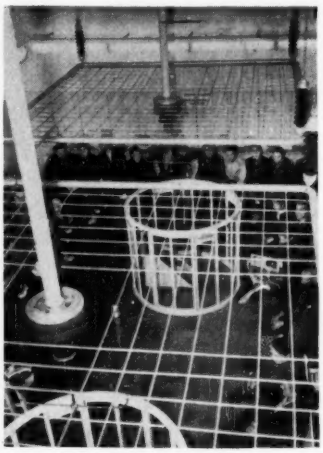
benzene in the product ran between 45% and 50%. Aromatic tar (about 40% naphthalene) accounted for about 10% of the product; the lean gas consisted of methane, hydrogen and water vapor.

Potato Farmer: As far as his life in Russia was concerned, Winkler reports that he underwent no great hardships. His lot as an executive stood in sharp contrast to the slaves who built the plants. In fact, the only manual labor required of him was growing potatoes for his own consumption, and even that was more relaxation than labor for the farm-bred scientist.

Like all loyal Poles, Winkler has a deep-rooted hatred for the Communists' philosophy and methods. And although he made what may be a significant contribution to Soviet industry, he did it with a gun at his back.

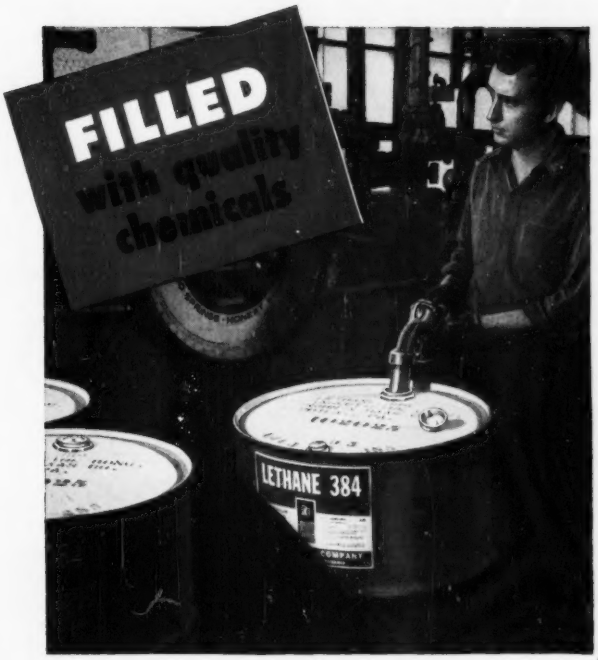
EQUIPMENT. . . .

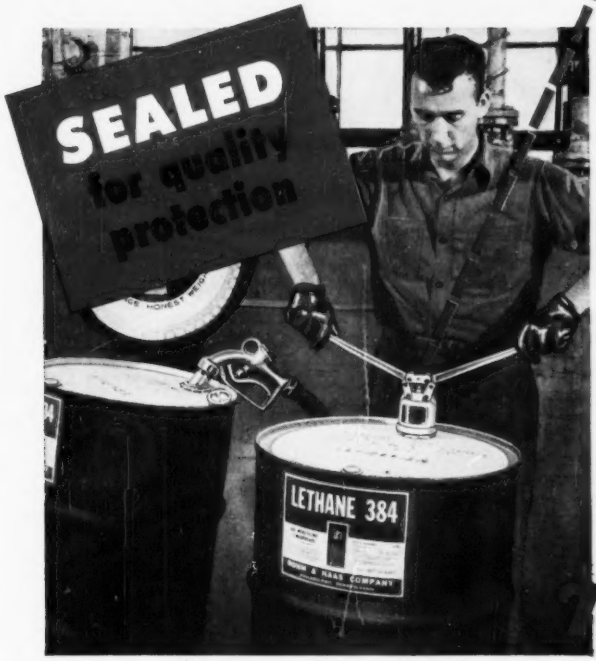
Resin Kettle: Brighton Copper Works (Cincinnati) claims to have a new 1,000-gal. synthetic resin kettle that reduces initial as well as operating costs. It features push-button control, a recording controller and choice of two- or variable-speed agitator.



Spray Cure

SILICOSIS, an incurable malady that is prevalent among workers in various process industries, is now being attacked from a new direction by German doctors. They are trying a fine spray of mineral water in an electrostatic field in an effort to cure afflicted workers of the Rosenthal Porcelain Co. (Selb, South Germany). Beads of the mineral water are kept afloat by the electric force; the theory is that they penetrate the lungs as far as do the dust particles and affect the cure.





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Rohm & Haas Company—one of the leading manufacturers of plastics, synthetic resins and chemicals—has used Tri-Sure* Closures since 1936. Year after year, their products are shipped all over the world—in drums that *deliver* the same high quality that leaves Rohm & Haas plants.

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Give this protection to *every* shipment, by specifying "Tri-Sure Closures" on every drum order.

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SPECIALTIES . .

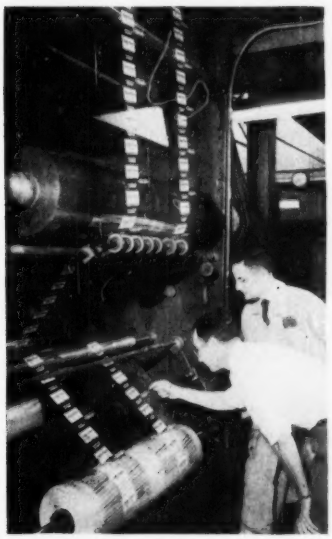
Plus in Packaging

Expansion of aniline ink-producing facilities is an indication of bourgeoning markets in packaging applications.

Further increases are ahead as better multi-color printing procedures are developed.

Aniline inks*, once looked down on by printers as "rubber stamp inks", are now gaining acceptance in the packaging field. As a result, production is booming; example: One of the major producers has just upped capacity eightfold.

These inks are used on a variety of materials—from kraft paper and cotton cloth to cellophane, polyethylene and Pliofilm. On some of these, the "aniline ink method" is the only kind of printing possible. But their quick-drying properties make aniline inks economical for printing on other materials as well.



CELLOPHANE PRINTING: One end-use for aniline inks.

The size of the business is difficult to estimate, for the printing ink industry – like many other specialty fields – is an extremely competitive one, and production figures are top secret. Almost every ink manufacturer has a finger in the aniline ink pie, but four companies probably account for the major slice of the business: International Printing Ink division of Interchemical, Bensing Brothers and Deeney, Sinclair and Valentine, and Sun Chemical. In general—but there are notable exceptions—other manufacturers custom formulate aniline inks for customers who have been buying other types of ink.

Aniline inks today are usually pigment—not dye—inks. There are two general types: spirit inks which have an organic solvent as the vehicle, and emulsion inks where water is used as a thinner.

Aniline ink printing uses embossed rubber rollers, contrasted to the metal plates employed in almost every other printing process. While early techniques and formulations gave crude results, aniline ink printing is now an art.

In general, it finds its main use in short-run label and package printing. Printing by the gravure method is still most economical when the number of labels or cartons printed at one time is in the hundred-thousands or millions. The cost of embossed rubber rollers is far less than that of the engraved copper cylinder which is the heart of gravure production.

For the smaller manufacturer who doesn't want to keep a whopping inventory of packages, as well as for the one who orders a multiplicity of labels, aniline printing is the only process.

Makers Delight: Constant improvements in printing technique have opened new markets for the process; hence manufacturers are finding fertile outlets for their increasing production.

Not too long ago, only line drawings could be reproduced by the process, but now variable-tone originals (such as photographs) are being turned out. As yet, full-color printing with aniline inks is still in the future. Ink manufacturers, however, are counting on a further bonanza in sales when it does arrive.

P. I. Specialties

Import control in the Philippines has boomed establishment of new industries, including branch factories of foreign manufacturers, importation of whose products is now banned or restricted.

Conserving dollar exchange and en-

* The name aniline ink is a misnomer. By definition, instant-drying ink would be more apt; but the name applied when the "inks" were little more than alcoholic dye solutions still remains.

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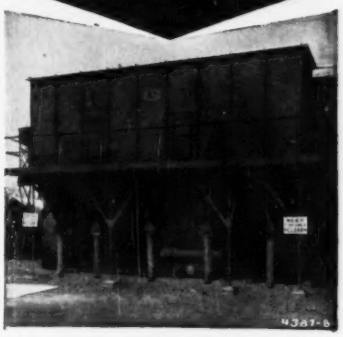

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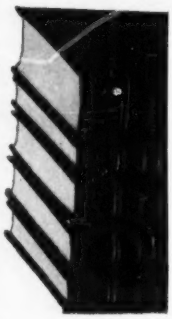

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couraging its utilization in more productive fields were among the primary objectives of the import restrictions, but they have been largely ineffective in this respect. They have, however, fostered a number of new industries.

Cosmetic and allied plants were among the first industries to be established as a result of import control. Philippine Manufacturing, a subsidiary of Procter and Gamble, now produces its own soap instead of merely distributing the finished product processed in the U.S. Philippine Refining (a Lever Bros. subsidiary) is also manufacturing soap which used to be imported. Colgate-Palmolive-Peet has a 3 million peso plant outside Manila. This plant is at present capable of producing enough soap to meet domestic requirements, but when it swings into full production, its output will be adequate to meet demand from other Far Eastern areas.

S. C. Johnson & Son is readying a plant at Manila to process bases shipped from the U.S. into finished products. Johnson has received a license for such importation, and by this means plans to recapture the wax market it lost when import restrictions went into effect.

Finally, a new Sharp & Dohme plant was officially opened last month. This unit, the first pharmaceutical manufacturing enterprise to be set up by the U.S. concern in the Far East, will produce at least 70% of the S&D line—including sulfa tablets—being distributed in that area.

New Ag Chems

Three chemical companies—Julius Hyman, Monsanto and Du Pont—have new compounds for agricultural use that are moving into an advanced developmental stage. Hyman has two new insecticides; Monsanto, a new hormone-type weed killer; and Du Pont, a new fungicide.

The Hyman products, still experimental and available for testing by qualified workers, are designated Compound 711 and Compound 269. They are stereoisomers of aldrin and dieldrin, respectively.

Indications are that 269 is effective against such insects as bollworm, boll weevil, cutworms, bark beetles, corn earworms, European corn borer, Mexican bean beetle, sugar beet webworm, thrips and some aphids. Compound 711, the more volative of the two, had given good control of bark beetles, corn earworm, European corn borer, sugar beet webworm, fall army worm, various aphids, plant bugs and thrips.

The herbicide, MCP (2-methyl-4-

Weeding for Weevils

ERADICATING WILD COTTON is one method the Venezuela Government is using to combat the cotton boll weevil, first discovered in plantations of that country in 1949. The wild plant, on which the weevil feeds, was sprayed with 200 tons of Shell Weedkiller 20 (a petroleum hydrocarbon) in 1950, and this year with 300 tons of the same product as well as a similar spray fortified with 2,4,5-T. This program, combined with aerial dusting of crops with such insecticides as toxaphene and aldrin, has brought the pest under control.

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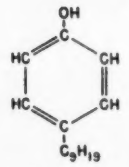


NONYL PHENOL—one of Koppers series of alkylated phenols—is produced in commercial quantities. It is a slightly viscous, yellow to tan liquid; only very slightly soluble in water, but miscible with common organic solvents.

REACTIONS

Two of the three normally reactive nuclear positions are unsubstituted in this alkylated phenol; they are subject to such reactions as acylation, sulfonation, nitration, alkylation, and condensation with aldehydes.

The unhindered phenolic hydroxyl group undergoes such reactions as etherification, esterification, vinylation, ethylene oxide condensation, and formation of nonyl phenoxyacetic acid.

USEFUL APPLICATIONS

The properties of Nonyl Phenol indicate usefulness in the production of modified phenolic resins, non-ionic surface active agents, lubricating oil additives, antioxidants, plasticizers and agricultural chemicals.

PROPERTIES

Boiling Range	**290°—300°C.**
Hydroxyl Number (theory 255)	**250**
Specific Gravity, 30°C.	**.940—.944**
Refractive Index, 20°C.	**1.5118**

FOR FURTHER INFORMATION, write to Koppers Co., Inc., Chemical Division

KOPPERS

KOPPERS COMPANY, INC.

Chemical Division

Dept. CW1-12, Koppers Building, Pittsburgh 19, Pa.

chlorophenoxyacetic acid), will be available from Monsanto in experimental quantities early next year. The company is the first U.S. producer of the material, already widely used in England and other European countries. The acid, a light tan, granular solid, is solubilized by converting to the sodium, potassium or amine salt; it may also be esterified.

Advantages indicated over other hormone types are that it is better tolerated by various grasses, cereal crops and legumes. It is effective in controlling such grain pests as Canada thistle and deep-rooted perennials.

Du Pont's latest farm chemical is the sixth of a series of organic plant protectants produced by the company from derivatives of manganese ethylene bis thiocarbamic acid. Chemically, manganese ethylene bisthiocarbamate, it will be available in limited quantities next year as Manzate fungicide for use on tomatoes and potatoes. Pending final word from the Government, it is expected to be recommended to control anthracnose, gray leaf spot and Septoria leaf spot on tomatoes, and early and late blights on both tomatoes and potatoes.

Although Du Pont's recommendations will be confined to tomatoes and potatoes for the present, further tests of the material's efficacy in controlling diseases on other crops will be continued next year in this country, Hawaii, Canada and Mexico.

Captive No Longer

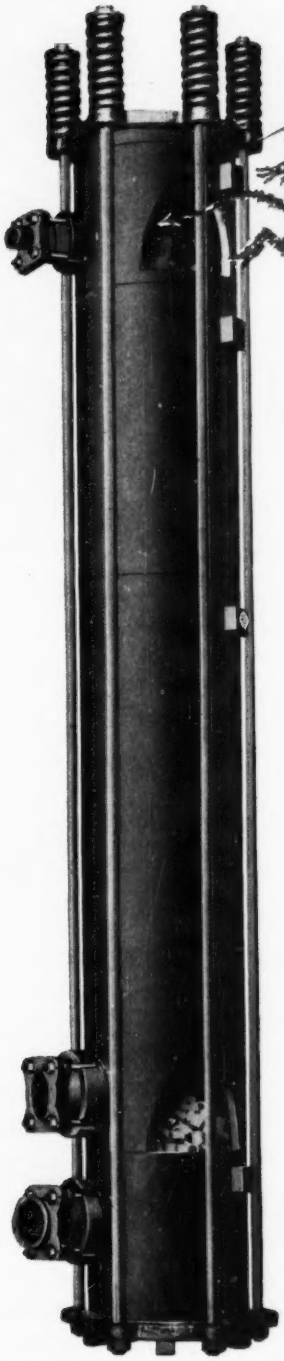
A $2 million program that will double its vinyl acetate polymers and copolymers capacity has just been launched by National Starch Products Inc. (New York). As a result, the company, which for some years has produced vinyl solutions and emulsions for its own adhesive formulations, will now supply these resins to other users as well.

It will market them as solutions, emulsions and hot melt formulations. The copolymers, which adhere to a variety of surfaces, can be "tailored" on a specialty basis to meet customers' needs. Potential applications are in adhesive formulations and various coatings.

As part of the expansion, to be accomplished over three years, National will also build a new research building.

•

Tile Paste: Schalk Chemical Co. (Los Angeles) has just introduced its newest product, Schalk's tile paste, which is expected to achieve national distribution by mid-month. The prod-



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"KARBATE" TOWERS do more than retard corrosion – they eliminate it *entirely* from such processing operations as absorption, fractionation, evaporation, extraction, scrubbing, and many others. Furthermore, the widespread acceptance of impervious graphite for all types of corrosion-free process construction has resulted in the manufacture of monolithic tower sections and fittings in sizes to 24" I.D.

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Isooctyl Alcohol	Polypropylenes	Paranox
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uct, an all-purpose white mastic, is packed in a 4 fl. oz. self-applicator type of tube, to retail at 75-89¢. Especially recommended for use around bathtubs and sinks and between tiles, is said to be waterproof, remain flexible.

•

Tobacco Dust Explosion: A double explosion and five-alarm fire considerably damaged the Richmond, Va. plant of The Tobacco By-Products & Chemical Corp. recently. It was impossible to estimate the loss immediately. The blaze, apparently caused by an explosion of tobacco dust, was fought for more than two hours by 100 firemen.

•

New Latex Paint: Latest to capitalize on the growing market for latex-base paints is National Gypsum Co. (Buffalo) which is now selling its new product, trade named Gold Bond Velvet, in a couple of cities, including Cincinnati, but will go national this month. Produced in 12 shades and white, it will retail just under $5 a gallon—and can be mixed to give an "infinite number of shades," according to the company.

National says Velvet can be used on new or old plaster, gypsum wallboard, wallpaper, brick, concrete or cinder block walls without priming. If walls are glossy, they should be dulled first, it cautions.

•

New Soap Plant: A new corporation, Acme Soap and Chemical Co., is building a plant in Charlotte, N.C., and expects to begin operations by March. Soaps, synthetic detergents, potash formulations and other products are to be produced. The company is affiliated with Acme Soap Co., Cambridge, Mass.

•

New Specialty Plant: Daly-Herring Co., Kinston, N.C., has leased quarters for a new plant at Ahoskie, N.C. The company formulates insecticides, disinfectants, and other specialties.

•

Finish Finisher: Minnesota Mining & Manufacturing has begun national distribution of a colorless finish for automobile metal trim. Sold under the trade name Corogard, the material is packaged in 8-oz. consumer containers, with larger sizes going to garages and industrial users.

PICTURES IN THIS ISSUE:

Cover (top) and p. 11 — Peter Erik Winkler, Calco Div.; Cover (bottom) and p. 24 — Syd Karson, McGraw-Hill Pub. Co.; p. 12 (top and center) — Peter Erik Winkler, Calco Div., (bottom) — Lederle Labs.; p. 13 — Wide World Photo; p. 14—Mercury Pictures; p. 26—World Wide Photo.

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FIFTH OF A SERIES

Tall Tale

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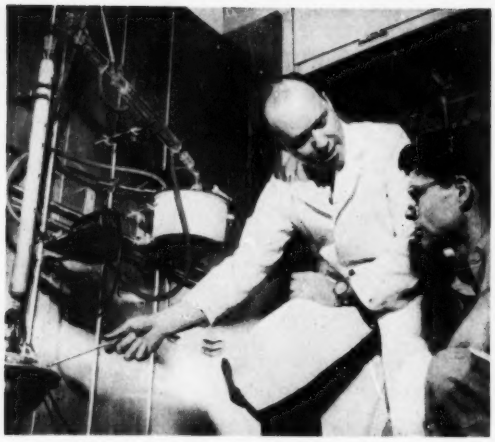
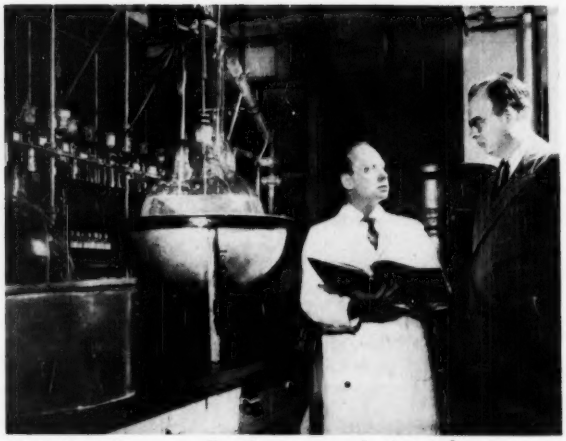
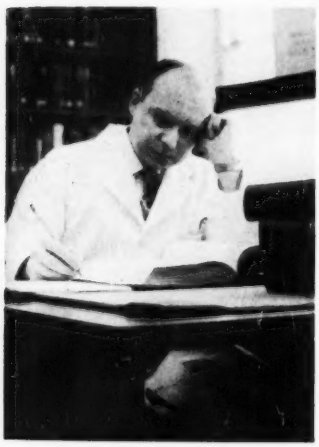


2 WORKING SYNTHESIS is first laboratory hurdle. Depolymerization of dicyclopentadiene, an early step, is explained by senior organic chemist Frederick Leonard.



3 SUCCESS on a small scale means graduation to larger equipment. Leonard and Organic Research Director John A. King discuss preparation of intermediate.



1 LIKE MOST budding research developments, Neotropine came out of a well-planned literature survey.

RESEARCH . . . .

Better Safe Than Sorry

CW Cameraman: Lyn Crawford

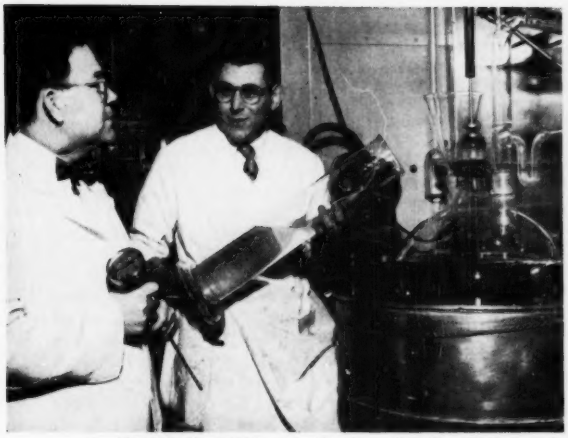
Chemical research is very much like a game of poker between the researcher and nature, with the elements and compounds as cards. The deck usually is stacked in nature's favor, and what's worse, it doesn't always play according to the chemists' rules. Throw in a joker, in the form of human physiology, and you have a fair idea of what the drug researcher is up against.

The game looks pretty one-sided, but the drug researcher has a few tricks of his own. This week CW sat in at the Warner Institute* for Therapeutic Research, saw them in action in the development of Neotropine hydrochloride—a new, smooth muscle antispasmodic.

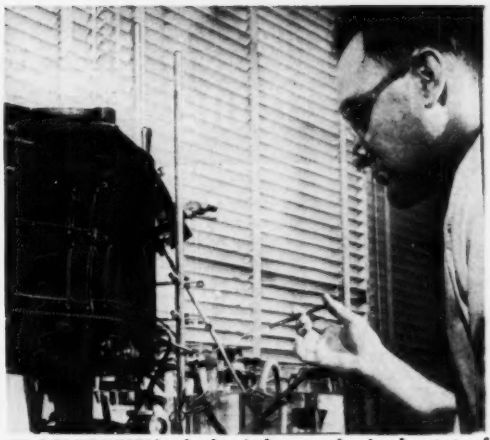
Neotropine, trade mark for 2-diethylaminoethyl - α - (2-cyclopenten-1-yl) -2-thienylacetate, is the result of a double-pronged research effort. But the chemical phase serves only as a prologue to the pharmacological. A true picture of the therapeutic effects and side-effects comes only from clinical experience. But long before the medics take over, the pharmacologist and biochemist have paid the first premium on industry's public health insurance.

* Of the William R. Warner Division of Warner-Hudnut, Inc.

8 MICE AID PHARMACOLOGIST Mary Lewis determine oral toxicity for the protection of future recipients of the drug. Pharmacological tests now are concluded. Next step is tabletting (right), but not before control chemists Eugene Balzer (center, left) and Harold Dobbs have their turn on the bulk pilot-plant product.



4 ANOTHER STEP, saponification of α-(2-cyclopentene-1-yl)-2-thienyl acetonitrile, is run off by chemists Freeman H. McMillan (left) and Jerome D. Genzer.

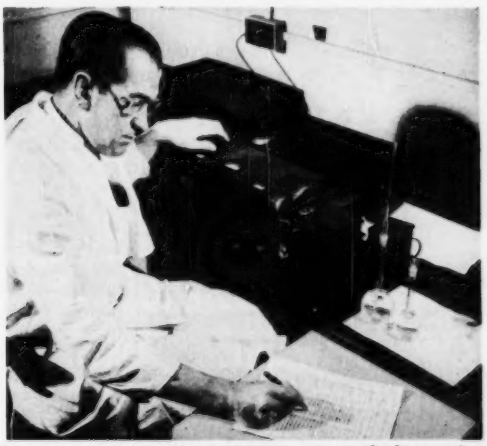


5 COMPLETION of chemical research signals start of physiological tests. In vitro test on guinea pig intestine measures activity of the new drug.

6 IN VIVO experiment with anesthetized dog reveals activity and effect on body functions. Pharmacologist Max Chessin reads automatically recorded data.

7 "BETTER SAFE THAN SORRY" is motto of pharmaceutical research. Monkey test provides data on still another experimental species, hints at drug's effect on humans.

9 TABLETS will be used in clinical evaluation. Pharmaceutical Research Director Fred C. Ninger looks on as Gene Johnston checks hardness, thickness and weight.



10 SPECTROPHOTOMETRIC assay is final operation. Control chemist Max Stenzel determines whether tablet activity meets specifications.

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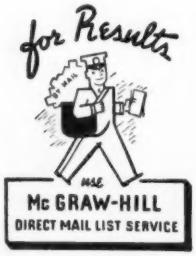

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Probe Underfoot

National Bureau of Standards has just closed out a study of the effects of grease, oils, alkalis, acids, soaps, etc. on representative products of 17 different floor covering manufacturers. Results should be of interest to coating producers as well as industrial consumers of floor coverings.

A standard technique for evaluating chemical resistance of the floor coverings unfortunately wasn't available, so Bureau researchers worked out a method of their own. A mechanical "fingernail" was set up and the depth of the scratch it made was taken as a measure of chemical resistance. Floor coverings were exposed to the various reagents for 24 hours prior to the scratch test.

Here's what the researchers found:

Vinyl plastic materials were most resistant to grease and oils. With few exceptions they also showed fair to good resistance to alkalis. Acid resistance generally wasn't as favorable.

Regular asphalt tiles didn't stand up to most oils and gave only fair results with beef tallow, a comparatively mild reagent. Some of the so-called "grease-resistant" asphalt tiles were far from outstanding in this respect. Moreover, most showed poor resistance to dilute acids.

All linoleums tested were materially affected by alkaline solutions and were partially disintegrated by a 1% solution of caustic. They didn't show well against acids and hydrogen peroxide, and with the exception of battleship linoleum, were appreciably softened by kerosene.

Kerosene Nemesis: Like the linoleums, rubber tiles proved vulnerable to kerosene. And their resistance to dilute acids and alkalis varied from good to poor. Enamel print, felt-base floorings were damaged by alkaline cleaners, dilute acids and kerosene; mastic coverings also fell down on kerosene resistance as did certain resin compositions. A cork composition flooring took kerosene in its stride, but couldn't cope with caustic solutions.

The vinyl plastics probably possess the best all-round protective properties. But other factors limit their practical usefulness. One of these: Vinyl plastics need a dry base, probably can't be installed on concrete floors which are in direct contact with the ground. Asphalt tile, on the other hand, is okay on damp concrete.

•

Information Please: The Federal Government is spending $2½ billion on research, but mighty little on publicizing the results. The problem is a source of serious concern to those in the Government responsible for getting the news out. Ernest G. Moore, information chief for Agricultural Research Administration reveals that ARA has almost 11,000 people in research and control work, but only 13 information staffers.

"Those responsible for agricultural research have done only half their duty when they acquire useful information. To finish the job, they must diffuse that information to all who might possibly benefit," he said.

Many agencies, however, follow an opposite policy, distribute scientific reports only if the applicant can prove a "need to know."

•

Gentisate Prep: The synthesis of gentisic acid and its salts, interesting as antipyretics, is the subject of a patent (U.S. 2,547,241) recently awarded to F. B. Zienty of Monsanto Chemical Co. His method: hydroquinone is treated with carbon dioxide under pressure in the presence of water and sulfide ion to yield gentisic acid.

•

Quick Pickup: A new, powerful ganglionic stimulant is a disclosure of the research laboratories of Parke, Davis & Co. Known as DMPP (1,1-dimethyl-4-phenylpiperazinium iodide), the new compound is reported to be three to five times as potent as nicotine. Unlike nicotine, it isn't very active orally. DMPP should be of considerable value in pharmacological research; commercial applications are nonexistent.

•

New Diols: Two new chemicals, 2-ethyl-2-butylpropanediol-1,3 and 2,2-diethylpropanediol-1,3 are commercially available from Carbide and Carbon Chemicals Co., Division of Union Carbide and Carbon Corp. They undergo most reactions of primary alcohols and form esters which are useful as plasticizers, synthetic lubricants and emulsifying agents. Both products are crystalline materials with applications in the manufacture of insect repellants and pharmaceuticals.

•

Double Dose: Dihydrocillin is Upjohn Co.'s trade-name for a new, fortified antibiotic containing procaine, sodium penicillin G and dihydrostreptomycin. Reason for the wonder drug-duet: Gram-positive organisms are susceptible (in general) to penicillin, gram-negative to dihydrostreptomycin.

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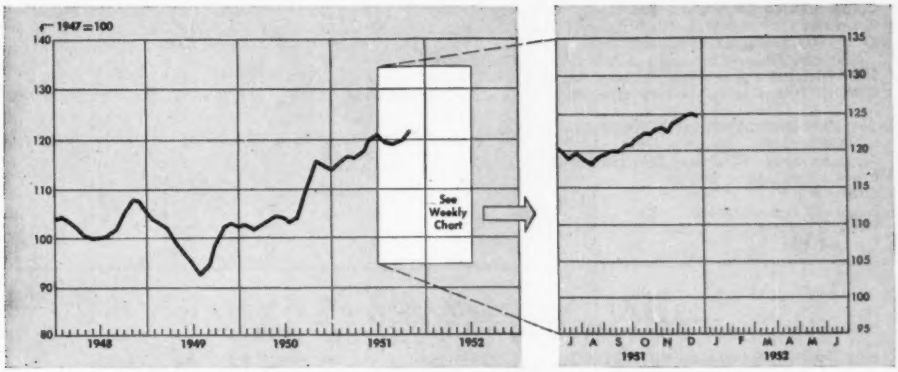
TTA: Dow Chemical Co. is offering limited quantities of 2-thenoyltrifluoro-acetone, a new sequestering agent.

MARKETS . . . . . .



CW Index of Chemical Output—Basis: Total Man-Hours Worked in Selected Chemical Industries

Most far-reaching development in the market this week is the price dip in fermentation-made industrial alcohol. The decline—from 90¢ to around 75¢ a gallon—narrows the gap between fermentation alcohol and synthetic, which sells for 55¢. U. S. Industrial Chemicals made the first move, was followed in the next few days by most of the other fermentation producers.

The downturn stems from a combination of ample supply and lethargic demand. Supplies of Cuban molasses are at near-record levels, and the 100 million gallons of alcohol imported from France helped to make somewhat of a glut. Synthetic rubber is well fixed for butadiene, needs little from alcohol.

The ever-changing chemical supply situation prompted NPA to alter its inventory restrictions. Limitations were lifted on four chemicals: nicotinamide, nicotinic acid, polyvinyl acetate, and phenolic resins and molding powders.

A process developed commercially in 1951 now skirts the pyridine shortage, will make supplies of this vitamin acid and its amide equal to demand within about three months. The improvement in polyvinyl acetate made lifting of inventory limits easy to foresee. The letup on phenolics by NPA, however, represents an abrupt reversal from the previous critical supply position last fall.

But NPA is now stricter on stocks of eight other items. A minimum practical inventory will be enforced for cellophane, alum, chemicals made from barium and lead, monochlortrifluorethylene, phenothiazine, and sulfonated oils.

Use allocations have been postponed for nylon plastic, and the order for hydrofluoric acid is now slated for a mid-January date. The long-awaited sulfur allocation order, however, has finally come through, with allotments still averaging about 90% of 1950 use.

One perplexity: The order requires producers to maintain the same ratio between captive use and sales. Enthusiasm for the regulation therefore depends largely on what the ratio was before.

MARKET LETTER

WEEKLY BUSINESSS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	123.5	124.0	116.4
Bituminous Coal Production (Daily Average, 1000 Tons)	1,554.0	1,783.0	1,926.0
Steel Ingot Production (Thousand Tons)	2,041.0	2,039.0	1,981.0
Wholesale Prices—Chemicals and Allied Products (1926=100)	137.7	137.6	141.2
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	246.8	240.4	210.3
Chemical Process Industries Construction Awards (Eng. News-Record)	$30,593,000	$23,882,000	$5,715,000

MONTHLY INDICATORS—WHOLSESALE PRICES (1926=100)	Latest Month	Preceding Month	Year Ago
All Commodities (Other than Farm and Foods)	177.1	177.2	175.8
Chemicals and Allied Products	138.7	141.1	135.7
Chemicals	144.7	144.7	134.3
Drugs and Pharmaceuticals	169.1	184.1	163.8
Fertilizer Materials	122.4	120.2	112.0
Oils and Fats	132.0	142.6	171.5

Nylon plastic is one commodity of a quintet that NPA transferred from Group I (critically short) to Group II (tight supply). Some others that eased: Allethrin; quinoline and its derivative, copper 8-hydroxy quinolinolate; p-nitrophenol.

Time has healed the shortage for ethyl cellulose buyers. Until the middle of 1951, getting almost any amount proved a feat. But since then, defense demands haven't met expectations for this extra-tough plastic, and the civilian market has been chary of the high cost—around 65¢ a pound—compared with modified polystyrene at about 40¢.

Eight products reversed a trend to easier supply in the new NPA listings. Benzene and toluene have returned to the critical group. Reasons: cutbacks in imports, stepped-up demands for chemical uses and high-octane gasoline. However, completion of new facilities this spring for aromatics from petroleum should bring relief.

New production targets by 1955 have been set this week for phenol, fixed nitrogen, and phthalic anhydride. By then, according to the DPA timetable, phenol output will top 620 million pounds—277 million above today's capacity. The nitrogen production goal of 2.93 million short tons provides for 500 thousand tons more than previous plans called for.

Thirteen applications for added phthalic capacity are under scrutiny by DPA. If these were all authorized, some 200 million pounds would by added to U.S. annual capacity—more than enough to meet the 1955 sights of 368 million pounds a year.

If order M-19 on cadmium use is amended, as seems likely, it will be the first easing of control over a non-ferrous metal since the defense program started. Supplies of this metal are adequate to take care of government demands—about 30% of output—and of civilian needs as well.

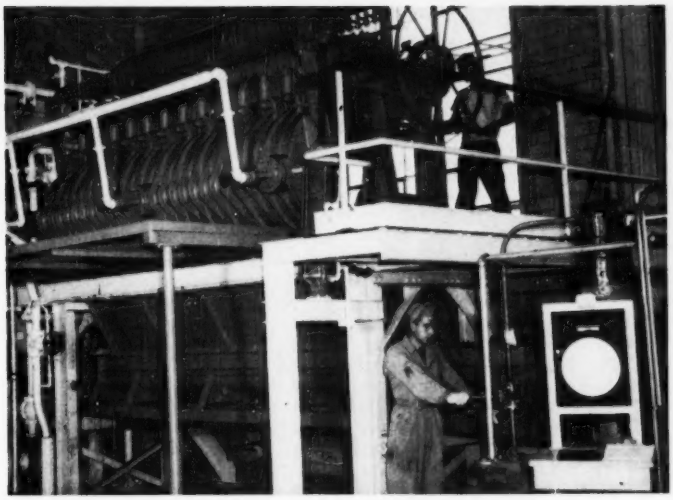
Faint hope is extended for getting more tin this year, unless price differences can be ironed out between Bolivian interests and RFC, sole U.S. buying agency. Bolivia considers it worth more than the $1.12 a pound bid by RFC.

Until this knot can be unravelled, tin supplies will be sufficient to handle only 40% of the normal demand of 5 thousand tons a month.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending January 7, 1952

	Change	New Price		Change	New Price
UP					
Ammonium nitrate, dom., wks., ton	$3.00	$64.00	Chromic acid, c. l., drum	$ .01	$.28
Carbon bisulfide, tank cars, cwt.	.10	4.80	Tartaric acid	.06	.455
DOWN					
Naphthalene, imp.	.005	.12	Quicksilver, 76 lb. flask	2.00	210.00

All prices per pound unless quantity is stated



SORBITOL MANUFACTURE: Fifty million pounds more puts pressure on sales.

Polyols In Flux

Glycerine production will be relatively steady in 1952, with higher synthetic output offsetting possible byproduct decline.

Pentaerythritol supplies will be up 50% this year, will give glycerine a battle for alkyd resins.

Quadrupled sorbitol capacity (now 70 million pounds) will spark a heightened competition in markets for polyols.

This new year will see a good deal of jockeying among the polyols for a stronger market position. Glycerine, the most widely used, will be up against stronger competition from sorbitol and pentaerythritol, which were expanded in 1951.

The competition won't be noted in permanent anti-freeze, where ethylene glycol—except for relatively minor amounts of propylene glycol—has preempted the lion's share of this business. But the battle for acceptance will be joined in the scores of other polyol uses.

Glycerine has been, and still is, by far the largest of the polyols for non-anti-freeze uses. The production in recent years has been averaging somewhat better than 200 million pounds a year, and its outlets are so diverse that it has served some as a barometer of business conditions. Since World War II, however, the glycerine picture has been changing. Predominantly, glycerine is still the byproduct of the soap industry, but synthetic glycerine continues to grow, while the soap industry has been facing stiffer competition from synthetic detergents.

Glycerine Focus: Best current estimate is that the supply of glycerine isn't going to vary much from a figure around 225 million pounds yearly. Despite a slowdown in soap sales in the last six months of 1951, soap makers have the feeling that year in and year out, the trend is still upward. This feeling is held even though synthetic detergents have made spectacular gains in the past and are still some distance from full stature.

Whether soap sales continue to hold up well in the face of such strong competition depends in a large measure on how prices compare. And if the headlong tumble in fats and oils prices is any criterion, there is a better-than-fair prospect that soap prices will come down. On the other hand, synthetic detergents have been under a certain amount of price pressure from raw materials benzene and sulfuric acid that would tend to deter—though not to preclude—lower prices.

From this comparison, it seems likely that soap sales are not in for letdown during 1952, at least. The effect on glycerine supplies of any long-term decline will be balanced by the increasing output of synthetic glycerine, which Shell Chemical is making at Deer Park, Texas, from propylene.

Half More Penta: Since the output of glycerine will be fairly steady, makers of the other polyols will have to depend on moving in on some glycerine outlets or finding new uses to widen the markets. For instance, alkyd resins and ester gums make up the largest single use for glycerine—about one third of the total output. Biggest competition here has been from pentaerythritol (PE). More than 35 million pounds of PE go into alkyd resins annually (half of the glycerine usage), and with a 50% increase in PE capacity for the coming year, competition for the alkyd resin business will mount.

Sorbitol by Four: Another polyol shooting for alkyd resin business is sorbitol, output of which has quadrupled in a twelve-month period. With completion of the latest capacity boost by Atlas Powder last month, production can now attain the 70 million pound-level, a far cry from a modest 15 million pounds yearly in early 1951.

Sorbitol has already established itself as an humectant and in the synthesis of Vitamin C. But it is said to have added merit in such applications as the strengthening of glues, making fast-drying varnishes, and wetting agents.

Multiple Foray: Though sorbitol and PE are currently fastest-growing, propylene glycol and diethylene glycol producers are following a policy of expanding with the markets. All of these polyols will have an important bearing on where the customer's dollar is spent.

What the outcome will be depends on such variables as selling price, inherent suitability for use, and degree of promotion. But at this stage it's safe to say that supplies will be ample and that competition will be keener in 1952.

Palate Pleaser

To the Japanese, it is aji no moto*; to Americans, it is monosodium glutamate (MSG); to producers, it means a profitable source of revenue. But currently it is also a headache: Demand has risen faster than production.

The monosodium glutamate market is tight, as bulk food processors up their demands for the flavor-

* Translation: base of all flavor.

heightening chemical. Despite the fact that capacity in the U.S. jumped from 3.7 million pounds per year in 1945 to 12.5 million at present, production has been limited by the ticklish problem of developing a market for the by-product wheat starch.

MSG sales for 1950 were 8,752,600 pounds, compared to a 1948 figure of 6,070,600. Production during 1951 should come close to the 10 million pound mark.

Soup to Nuts: MSG is valuable because it enhances flavor of salty foods while adding none of its own. While use in home kitchens is expanding, it is in the industrial field where real increases have come. Biggest buyers today are the soup canners, with poultry and meat processors not far behind. One indication of MSG's potentialities was discovered by a tuna fish packer. In a test market, this packer's brand had been responsible for 50% of the sales. By adding glutamate, his brand cornered 75% of the market. (Of course, other packers were not using MSG at the time.)

Unfortunately, bulk demand is seasonal, compared to consumer use. Heavy demands begin in December and last well into the summer months. MSG producers usually build up stocks during slack months, but this year, increased demand from the armed services has eaten up much of this surplus, leaving some regular buyers only partly satisfied.

An indication of this pickup in demand was the increase in drum price from $1.63 to $1.69 per pound.

Starchy Problem: In spite of demand, production can't readily be increased until manufacturers solve a knotty by-product problem. Glutamate is derived from wheat gluten, but every pound of gluten produced means 11 more pounds of wheat starch. Markets for this starch are still limited, and present prices for glutamate don't warrant "dumping" of starch.

One future supply hope is glutamate derived from sugar beet protein wastes. International Minerals and Chemical Corp. is testing such a source, but commercial production is not expected before 1953. A more distant possibility: production from soybeans.

International—with about 60% of the business—is the biggest manufacturer of MSG; others are Huron Milling Co., A. E. Staley Mfg. Co., and General Mills, in that order. International's Accent and Staley's Zest are the major mass-marketed products, though some food specialty houses buy MSG in bulk and repackage it.

Further On: Makers see rosy possibilities in the future. In the Hawaiian Islands, where glutamate compounds have long been used, consumption averages half a pound per person per year. While it is extremely unlikely that U.S. consumption could ever equal this figure, if it did, this would mean a 75 million pound-demand potential.

But before output approaching such a figure could be reached, the serious raw material-by-product worry would have to be solved. Manufacturers, right now, are more worried about how to meet present demands equitably.

GOVERNMENT AWARDS

Item	Supplier	Location
Detroit Arsenal, 28251 Van Dyke, Center Line, Mich.:		
Commercial grade propane gas	Sun Oil Co.	Toledo, Ohio
Corps of Engineers, U.S. Army, Chicago Procurement Office, Chicago 6, Ill.:		
Ammonium sulfate	Summers Fertilizer Co.	Baltimore 2, Md.
Ammonium sulfate	Cobelaz, Bruxelles (care Belgameric, Inc., Empire State Bldg.)	New York, N.Y.
Philadelphia Ordnance District, 1500 Chestnut St., Philadelphia, Pa.:		
Ethyl Centralite, flake	Sharples Chemicals, Inc.	Philadelphia, Pa.
Corps of Engrs., New York District, 80, Lafayette St., New York, N.Y.:		
Cellulose acetate plastic	Eastman Kodak Co.	Rochester, N.Y.
Navy Purchasing Office, New York, N.Y.:		
Gas, aerosol, insecticide	Pennsylvania Eng. Co.	Philadelphia, Pa.
New York Quartermaster Procurement Agency, 111 East 16th St., New York, N.Y.:		
Chlorinated lime (20-lb. export pack)	Pennsylvania Salt Co.	Philadelphia, Pa.
Cincinnati Ordnance District, Cincinnati 2, Ohio:		
Aluminum Powder, type C	Reynolds Metals Co.	Louisville, Ky.
New York Chemical Procurement District, 111 East 16th St., N.Y.:		
Red phosphorus, amorphous	Duff Chemical Co.	New York, N.Y.

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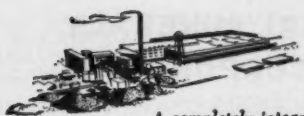

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BOOKS . . . .

Basic Methods of Marketing Research, by James H. Lorie and Harry V. Roberts. McGraw-Hill Book Co., New York N.Y.; 453 pp., $6.

Nontechnical text discussing basic tools underlying marketing research, such as experimentation, sampling, observation and communication, rather than specific applications of these tools. Stresses theory of marketing research and treats developments in pertinent fields of statistics, psychology, economics, sociology, etc.

Molesworth's Handbook of Engineering Formulae and Data. The Macmillan Co., New York, N. Y.; 1672 pp., $7.25.

34th edition furnishing engineering data and information which covers the spheres of civil and general engineering, mechanical engineering and electrical engineering. Scope of volume includes: basic laws and formulas; tabular data; mathematical tables for engineering problems; physical and chemical data; construction details and material specifications; list of trade names of engineering plastics and suppliers, etc.

MEETINGS . . .

Plant Maintenance Conf., Convention Hall, Philadelphia, Jan. 14-17.

Manufacturing Chemists' Assn., inter-industry conf. on chemicals in foods, Statler Hotel, New York, Jan. 15.

Soc. of Plastics Engrs., national technical conf., Edgewater Beach Hotel, Chicago, Jan. 16-18.

Drug, Chemical & Allied Trades section of New York Board of Trade, mid-winter luncheon meeting, Astor Hotel, New York, Jan. 17.

Compressed Gas Assn. Inc., annual meeting, Waldorf-Astoria Hotel, New York, Jan. 21-22.

Assn. of Amer. Soap & Glycerine Producers, annual conv., Waldorf-Astoria Hotel, New York, an. 22-23.

Technical Assn. of the Pulp & Paper Industry, annual meeting, Commodore Hotel, New York, Feb. 18-21.

Manufacturing Chemists' Assn., air pollution abatement conf., Statler Hotel, New York, Feb. 25-26.

Drug, Chemical & Allied Trades section of New York Board of Trade, annual dinner, Waldorf-Astoria Hotel, New York, Mar. 6.

Natl. Assn. of Corrosion Engineers, annual conf. & exhibition, Buccaneer Hotel, Galveston, Texas, Mar. 10-14.

Amer. Inst. of Chem. Engineers, Atlanta Biltmore Hotel, Atlanta, Mar. 16-19.

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Centrifugal, 36"x40", Bird, Continuous, Consolidated Products, 14-18 Park Row, N.Y. 38, N.Y.

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Column, S.S., Sieve Plate, 16 Plates, Size 18" x 18 ft. Arthur Process Equip. Co., 29 B'way, NYC

Column, Steel Bubblecap, 21" diam., 20 plates 7" Sp. Arthur Proc. Equip. Co., 29 B'way, NYC.

Dryer, Vacuum Shelf Dryer, MD Pumps, 3 HP motor. Eagle Indus. 110 Washington St., NYC.

Dryer, Vacuum shelf, Devine, double door, 17 shelves, pump, condenser, 3, Consolidated Products, 14-18 Park Row, N.Y. 38, BArclay 7-0600.

Dryer, Devine 20 Shelf Vacuum Chamber. First Machinery Corp., 157 Hudson St., N.Y. 13, N.Y.

Dryers, Devine Vacuum Drum, 5' x 10'6". First Machinery Corp., 157 Hudson St., N.Y. 13.

Evaporators Single and Multiple Effect, Including long tube type. Send for blueprints. First Machinery Corp., 157 Hudson St., N.Y.

Evaporators, Multiple effect in copper or steel. First Machinery Corp., 157 Hudson St., N.Y. 13.

Filter, Alsop S.S. 8x10 w/pump and motor. Mach. Ex., 131 Thompson St., NYC GR 7-3044.

Filter, 4'6" x 6' Feinc Rotary Vacuum, Alum. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

Filter, 8'x8' Rotary Vacuum Precoat, Acid Resist. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

Filter, 8'x12', Feinc all S/S Rotary Vacuum, Consolidated Prods., 14-18 Park Row, N.Y. 38.

Filter Press, 24"x24", aluminum, 24 chambers, Consolidated Prods., 14-18 Park Row, N.Y. 38.

Filter Press, 30"x30", aluminum, 45 chambers, Consolidated Prods., 14-18 Park Row, N.Y. 38.

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Filter Press, 30"x30", iron, Sperry, steam heated, 30 chambers, Consolidated Products, 14-18 Park Row, N.Y. 38, N.Y., Barclay 7-0600.

Filter, Sweetland #5, 29 leaves. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

Hammermills Heavy Duty Powerful Mills with motors up to 125 H.P. Send for blueprints. First Machinery Corp., 157 Hudson St., N.Y.

Mill, New 6x12" 2-rolls, Johnson Joints, 5 HP motor complete. Eagle Industries, 110 Washington St., N.Y.C.

Mixer, 110 gal. stainless Patterson Vacuum, Consolidated Prods., 14-18 Park Row, N.Y. 38.

Mixer, Lab BP Vacuum, 17 gal. Jktd. MD, complete. Eagle Industries, 110 Washington St., N.Y.C.

Mixer, 200 gallon B.P. Jacketed, m.d., Consolidated Products, 14-18 Park Row, N.Y. 38.

Mixer, 7000#, Dry Powder, horiz. jack. 12'x5' x5', spiral agitator, Consolidated Products, 14-18 Park Row, N.Y. 38, N.Y., BArclay 7-0600.

Pebble Mills International 8' x 8', porcelain lined, complete with gear motors. First Machinery Corp., 157 Hudson St., N.Y.

Pulverizer, Raymond High Side 5 roll, Consolidated Products, 14-18 Park Row, N.Y. 38, N.Y.

Sifter, No. 71, Day Roball, all S/S, 40"x48", 4, Consolidated Prods., 14-18 Park Row, N.Y. 38.

Still, 500 Gal., Steel, Vac. & Agit., Jktd., 125#. Arthur Process Equip. Co., 29 B'way, N.Y.C.

Tablet Press, Stokes DD2, 23 punch, Consolidated Products, 14-18 Park Row, N.Y. 38, N.Y.

Tablet Press, Stokes R, single punch, Consolidated Products, 14-18 Park Row, N.Y. 38, N.Y.

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RATES: undisplayed: $1.30 per line (½ for positions wanted)
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CLOSING DATE: Wed. for issue dated Sat. following week.

READER SERVICE . . . . .

HOW TO USE COUPON

Circle page numbers of items about which you want more details. Then write your name and address on the coupon at the bottom of the page and mail it to us. Your request will be forwarded to companies concerned, the answer coming direct to you.

MAKES IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a,b,c) indicate additional products in the advertisement.

Editorial Items:—Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

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For more data, circle number on coupon.

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Digitoxin, U.S.P. XiV T18b
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READER SERVICE COUPON

Mail to Chemical Week, 330 W. 42nd St., N. Y. 36, N. Y.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

CITY & STATE _____

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Expires April 12, 1952

BOOKLETS . . . . . .

Chemicals

Reagents and Fine Chemicals

264-p. catalog listing approximately 1,000 products — laboratory reagents and fine chemicals—for laboratory and industrial uses. Catalog gives information on products listing them in such categories as organic chemicals, filter paper, stains and indicators. Horne's dry lead, mineral acids and ammonia, fine chemicals, special chemicals, pharmaceuticals, fluorine compounds, heavy chemicals and agricultural chemicals. General Chemical Div., Allied Chemical & Dye Corp.

Chemical Products

52-p. catalog containing a listing of firm's line of botanical drugs, chemicals, insecticide concentrates and rodenticides; catalog also outlines the company's processing and manufacturing facilities, foreign representation and research organization, noting certain natural antibiotic materials as an example of current research work. Prentiss Drug & Chemical Co.

Non-Ionics

24-p. brochure entitled "Esters by Glyco" presents tables of physical and chemical specifications of the non-ionic polyhydric alcohol fatty acid esters, together with application data on these esters when used as surface-active agents, emulsifiers, defoamers, penetrants and plasticizers. Glyco Products Co.

Starch Paste Resins

5-p. data sheets describe "Uformite" resins used in waterproof starch pastes to produce improved adhesives for corrugated boxes. The data is classified into the three principal uses for these starch-resin mixes: corrugating adhesives for boxboard, solid fiber board adhesives and bag paste. Also discussed: formulations, production techniques and other processing details. Rohm & Haas Co.

Cellulose Gum

Technical bulletin gives information on "CMC" with reference to physical and chemical properties, available types, viscosity, compatibility, uses, etc. Industries cited as using product include the pharmaceutical, cosmetic, detergent, laundry, textile and paper processing, adhesives and ceramics fields. Hercules Powder Co.

Surface-Active Agent

4-p. bulletin discussing Sorbit, described as a surface-active agent and strong solubilizing agent, gives information on specifications, solubility details, emulsification, detergency and wetting characteristics and biological properties. Applications for product are outlined under the headings of detergents, disinfectants, hydrotrope applications, textiles, metal processing, etc. Alrose Chemical Co.

Weed Killer

Technical bulletin describes 2-methyl-4-chlorophenoxyacetic acid (MCP), a hormone-type weed killer, claimed to be effective in the control of such grain pests as Canada thistle and deep-rooted perennials; bulletin outlines the product's uses and classifies various weeds, according to MCP susceptibility. Monsanto Chemical Co.

Petroleum Products

4-p. bulletin gives specifications and technical data on specialty petroleum products including U.S.P., N.F. and technical grade white oils, petrolatums, petroleum sulfonates, petrobases (petroleum sulfonates plus secondary emulsifiers), and various solvents. Pennsylvania Refining Co.

Equipment

Wet Cyclones

16-p. bulletin dealing with the "Dorrclone," a new cylindro-conical classification unit utilizing centrifugal force in place of gravity, describes its construction and operation, advantages, operating results, details on sizes and arrangements, and applications as used in desliming, dewatering, degritting, fine size classification, and other mineral and chemical processing operations. The Dorr Co.

Pulverator Hammer Mill

12-p. bulletin explaining and illustrating the construction features and "multi-impact" operating principle of the Pulverator hammer mill used for pulverizing limestone, oyster shells and other non-abrasive materials. Information and diagrams are also included with regard to capacities and dimensions along with performance details. Allis-Chalmers Mfg. Co.

Fuel Oil Heaters

6-p. bulletin discussing the advantages, design and construction, heating capacities, and dimensions of oil tank suction heaters utilized for heating heavy grades of fuel oil to pumping temperatures. This type of information is also given concerning preheaters, which raise the oil from pumping temperature to the higher temperature required for good atomization, combustion and control. Hauck Mfg. Co.

Scientific Equipment

20-p. issue of the firm's "Announcer" furnishing instrument descriptions and price information on scientific instruments such as the multiple stirrer and floc illuminator, Coleman autotrator, chromalox hot plates, clinical shakers, radiation motor, etc., along with a feature article on the subject of chemical spectroscopy. Eberbach & Son Co.

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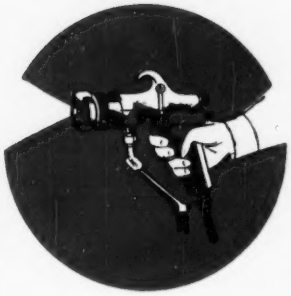

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It readily dissolves resins, dyes, oils, and waxes, and is mild-odored and water-soluble. CELLOSOLVE *solvent is* available for immediate shipment.

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A Division of Union Carbide and Carbon Corporation

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Offices in Principal Cities

In Canada:

Carbide and Carbon Chemicals, Limited, Toronto

PHYSICAL PROPERTIES OF "CELLOSOLVE" SOLVENT

Specific Gravity, 20/20°C.	0.9311
Boiling Point, °C. at 760 mm.	135.1
Dilution Ratio $\frac{\text{½ sec. Nitrocellulose}}{\text{Toluol}}$	4.9
Flash Point, °F (Cleveland Open Cup)	130

CELLOSOLVE solvent is miscible with water in all proportions.

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The term "Cellosolve" is a registered trade-mark of Union Carbide and Carbon Corporation.